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FOR THE HOME AND HOME OFFICE

JULY 1987

VOLUME 5
NUMBER 7

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FAMILY COMPUTING

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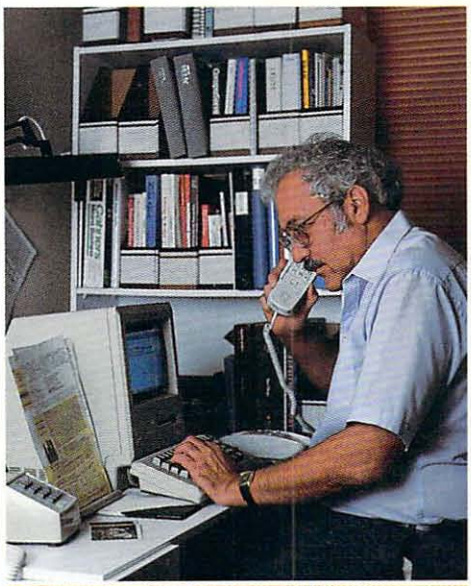
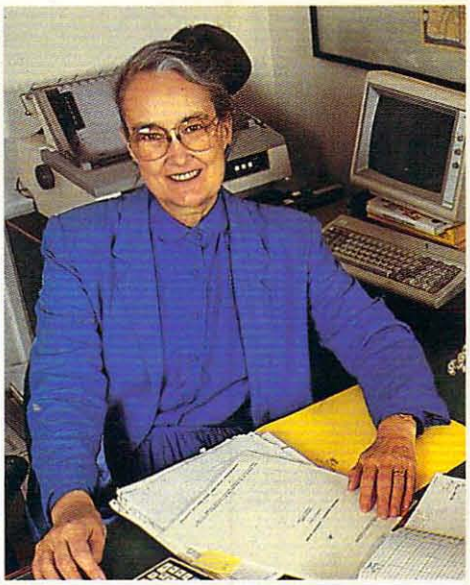
Home Business: Four Profiles of Success





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24 SOFTWARE REVIEWS

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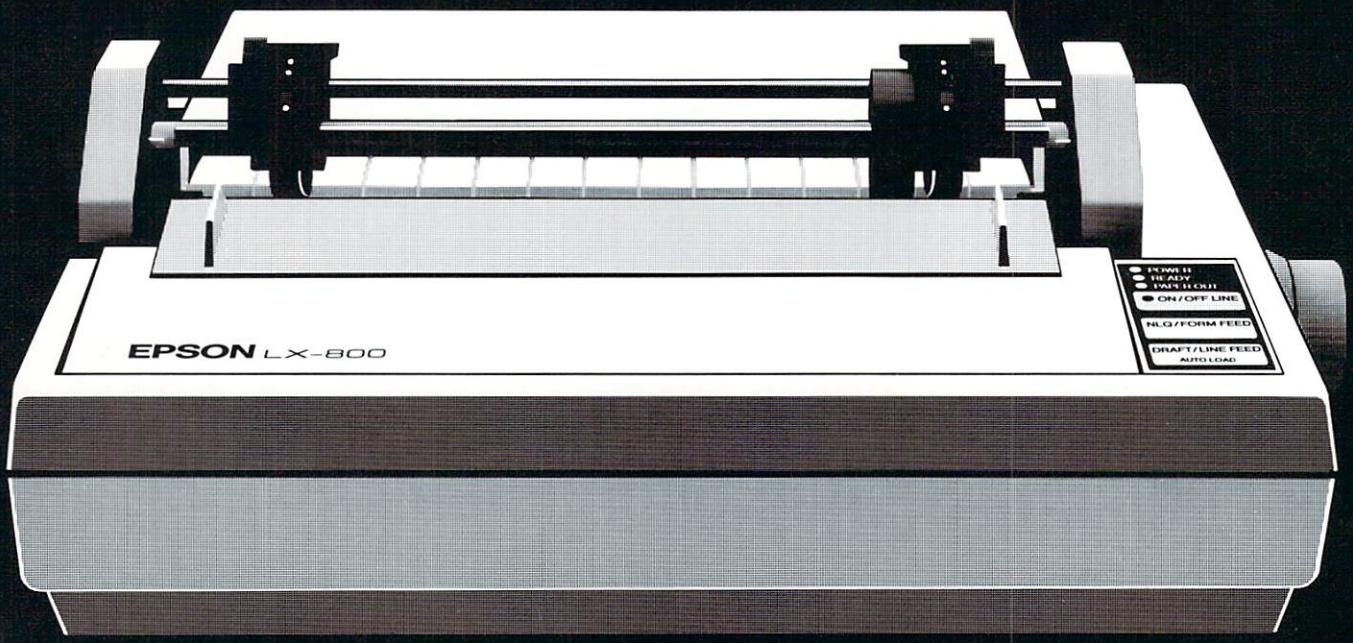

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keyboard row	✔	✔	
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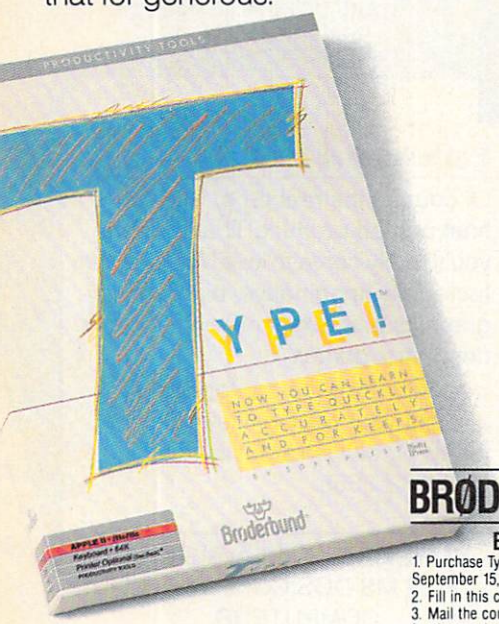

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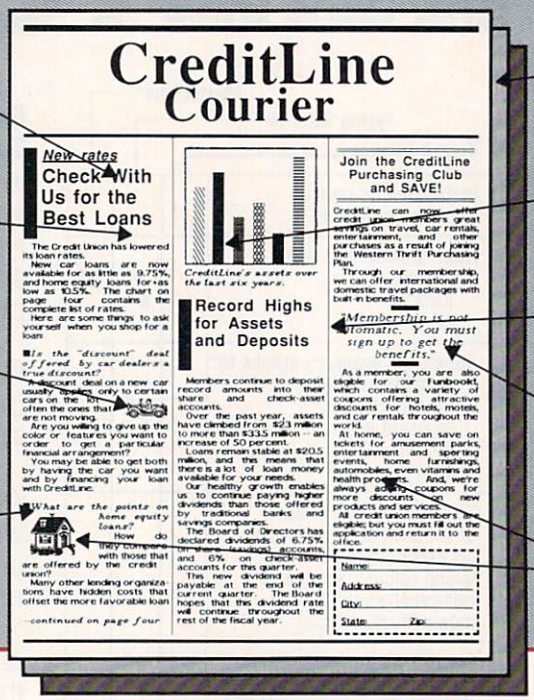

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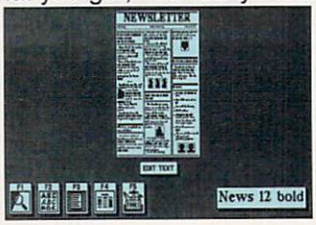

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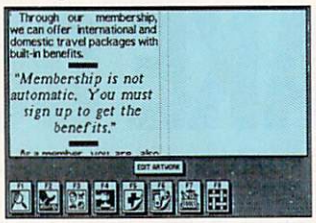

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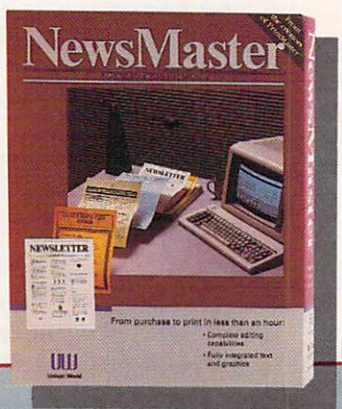

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CIRCLE READER SERVICE 19

PUBLISHED BY SCHOLASTIC INC.

JULY
1987

VOLUME 5
NUMBER 7

FAMILY COMPUTING®

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27
SUCCESS AT HOME
Four seasoned professionals tell how they created successful computer-based home businesses.
PLUS: TIPS ON MARKETING

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10
LESS IS MORE
Want to get the most out of your space? Discover the compact computer workstations, stands, and accessories that give you added room to work.
PLUS: COMPUTER-SUPPLY CATALOGS

PERSONAL FINANCE
14
MONEYMATE: THE PERFECT TEAMMATE FOR YOUR IBM
Use *MoneyMate* and your IBM or compatible to track credit-card statements, print checks, and tally the value of assets and liabilities.

EDUCATION
6
HOME-SCHOOL CONNECTION: KID-PROOF YOUR COMPUTER AND COMPUTER-PROOF YOUR KID
Tips on protecting delicate computer hardware and software from curious youngsters—and vice versa—while encouraging the habits of careful computer use.

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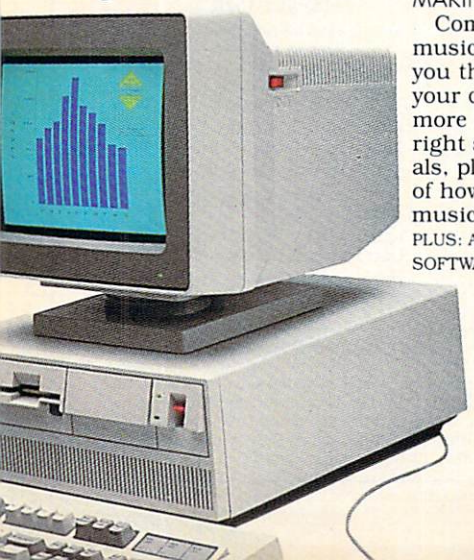

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PLUS: FULL-FEATURED, GATEWAY, AND MENU-DRIVEN DATA-BASE VENDORS

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PLUS: A GUIDE TO GREAT MUSIC SOFTWARE AND HARDWARE

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Don't let cooling bills make you hot under the collar! *A/C Sizer* can help you select the air conditioner that's right for the space you want to cool. Program for Adam, Apple, Atari, Commodore, IBM PC & compatible, Macintosh, Tandy, and TI computers.*

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PUZZLE
Crossword Puzzler, this month presented for Commodore, IBM PC & compatible, and Tandy computers with a Fourth of July theme, is the first in a series of crossword puzzles for these and other machines.*
NEXT MONTH: SOLUTION TO THE FOURTH OF JULY PUZZLE, PLUS DATA FOR A NEW PUZZLE

75
READER-WRITTEN PROGRAM
This fun, colorful graphics program for the Apple II series celebrates our nation's birthday—and has an exciting story behind its creation.*
*See program for specific computer models and hardware requirements.

COVER PHOTOGRAPHS BY DAVID HARPER, JIM KNOWLES, CLARK FISHER, MARK ADAMS (CLOCKWISE, FROM TOP LEFT)

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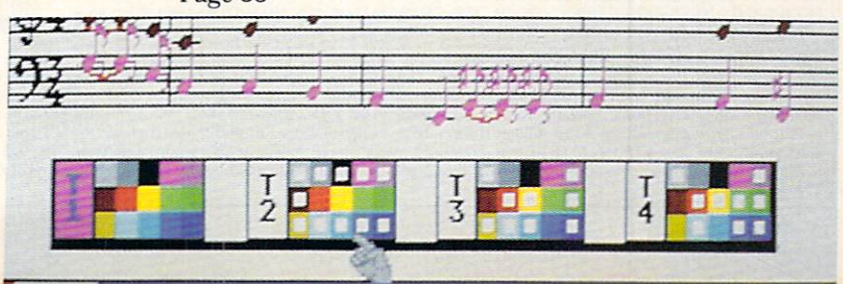


EDITOR'S NOTE

LET'S NOT KID OURSELVES—IT'S STILL NO PIECE OF CAKE

One of the miracles of computing continues to be the persevering user. I doubt that many of us imagined how extensive a journey we were embarking on when we decided to learn to use this technology.

Let's not kid ourselves. It's still no piece of cake to master a computer. We hear about user friendliness and progress; we at FAMILY COMPUTING even talk about it. But there's still a long way to go.

Getting the basics down pat is manageable for most of us, but as soon as we start wanting more—more speed, more power, more capabilities, more versatility, more customization, more, more, more—it means hard work for the user, as well as for publishers and manufactures. I speak from experience. And it's painful.

Our editorial staff is in the process of switching to a new, more powerful, and more versatile word-processing program. We are struggling. As a matter of fact, we are about two steps away from mounting photographs of the proponents of this program onto dart boards.

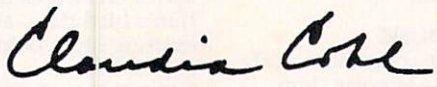
In addition to dealing with normal resistance to change, we face a program that is more demanding and that requires learning new procedures and remembering new commands. For some of us, accustomed to menu-driven programs, this experience is similar to discovering that our favorite, most comfortable eating spot switched from a full-service restaurant to a cook-your-own-food cafeteria where you can only eat while standing up. The meal may turn out to taste good, but it's at a price.

On a recent trip to northern California, where I was on a panel at a Software Publishers' Association conference and where Senior Editors David Hallerman and Nick Sullivan were on panels at the West Coast Computer Faire, we saw more evidence of personal struggles to master computing. The three of us visited several publishers, all of whose offices contained large rooms full of support people sitting at computers answering phone calls from confused customers. These included many repeat calls from experienced, long-time computer owners.

Whenever *I'm* stumped, I have the luxury of calling out to a member of our technical staff. And that's what other people in corporate offices do as well. But don't think that even the experts know it all. Our technical staff members are constantly reading documentation—in the office and out—and they too are among the callers for support. Remember, even the experts struggle.

What does this mean for the individual who decides to go it alone or to work with a small staff? It means turning to friends; it means reading; it means trial and error; it means calling for help; and it means persevering.

You deserve praise. But your efforts are not in vain. They produce income. They reduce costs. They increase productivity. They lead to great satisfaction. And in most cases, they result in a desire for more. We'll continue to try to help you out of the tough spots you face. In the end, it's worth a lot. And remember, you are not alone.



—CLAUDIA COHL
EDITOR-IN-CHIEF

P.S. That new word-processing program I griped about isn't so bad.

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LETTERS

MILITARY NEEDS MAIL ORDER

Since we're stationed overseas, computer peripherals are not readily available to us. Unfortunately, dealing with stateside mail order companies isn't always an option, since many of them are unwilling to mail their wares to APO or FPO addresses. It seems they don't understand the concept of the military mail system.

Apparently, they don't understand that the military postal service assumes responsibility for shipping the items to military bases throughout Europe and Asia, and postal rates to APO New York and FPO San Francisco addresses are the same as they are to any New York or San Francisco addresses. Similarly, we pay stateside rates for the mail we send to the U.S.

When they realize this, maybe computer mail-order companies will treat American servicepeople a bit differently. Thanks for the forum.

CAPT. RONALD E. MILLER
Boerfink, West Germany
(APO New York)

USE A LITTLE COMMON SENSE

I disagree with a statement made in the article, "Modems in the Mainstream" (*Telecomputing, March 1987*).

The chart on page 26 lists the Commodore 1670 modem as not being Hayes compatible. Since my 1670 modem uses the Hayes command protocol 1, I assume that it *is* Hayes compatible.

JON BRANEN
Homedale, Idaho

EDITOR'S NOTE: *You are right. Commodore confirms that the 1670 modem is Hayes-command compatible.*

HELLO DOWN THERE!

We Canadians sometimes feel like orphans when we pick up computer magazines and nothing appears regarding the good health of the Canadian computer market.

Might I suggest that some magazine—such as yours—do a little more reporting about the Canadian computer user?

JOEL R. MORRIS
Prince George, British Columbia

THE CLUB SANDWICH PERCENTAGE

This is in response to your Editor's Note in the April 1987 issue of FAMILY COMPUTING. A reader survey showed 49 percent of your readers have a home office. Of those, 60 percent run a home business and 40 percent do job-related work at home. I represent the "club-sandwich" percentage.

I use moments, half-days, and available evenings to manage my personal financial records and estate records, do correspondence, and prepare a billing statement for a local water association. In addition, I do a monthly bulletin, manage and update rosters and mailing lists for my Kiwanis Club, prepare a project roster for the local YMCA club, do a bimonthly bulletin, financial spreadsheet, and activities rosters for my square dance club, and meet monthly with my computer club.

I'm retired, but I'm still a workaholic; I'm even thinking of starting an association of non-profit newsletter producers.

WILLIAM H. CLARK
Lynden, Washington

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NEIL J. RUBENKING
PIANOMAN, NAMEGRAM

Author Rubenking's goals are straightforward: to have fun with computers and get paid for it. So far he is batting 1000. Along with his technical support position he also edits a column in PC Magazine titled 'Turbo Power User'. His PIANOMAN and NAMEGRAM programs evolved while he was teaching himself Turbo Pascal programming. Finding basic computer tunes "offensive" his PIANOMAN used his musical background as a source to create music on a PC (within the limits of its 2" speaker).

PIANOMAN allows you to:

Play your PC keyboard as if it were a piano, Save and edit your tunes, Compile your tunes to a self-running program & another option turns your tune into a macro for Superkey.

NAMEGRAM is wild, wacky and is a must for anagram (the ability to make a word or phrase from another word or phrase) freaks. After experimenting with algorithms, author Rubenking came up with a program that would handle any size of input and any size of dictionary.

☐ **279 PIANO MAN V3** **$6**
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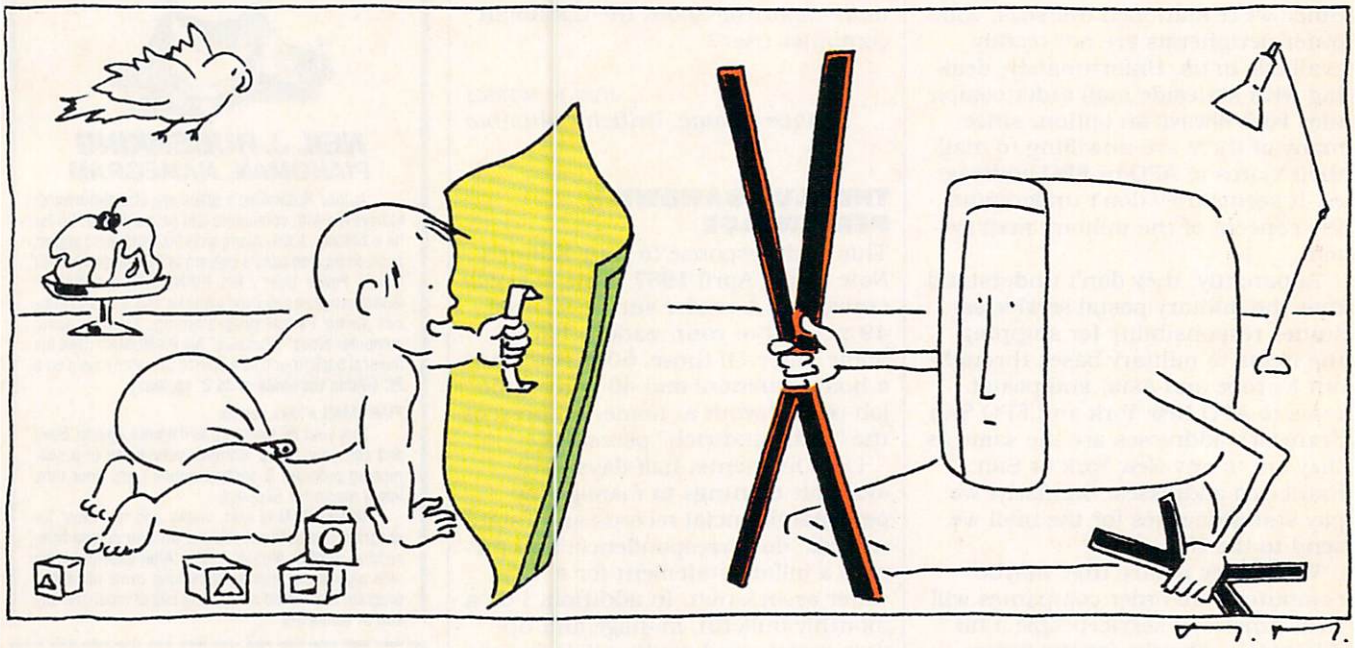
HOME-SCHOOL CONNECTION

KID-PROOF YOUR COMPUTER AND COMPUTER-PROOF YOUR KID

Preparing for Close Encounters Between Your Micro and Your Tot

BY MARIO PAGNONI



A friend of mine once volunteered to use his Macintosh to finish the work on an important business deal. He took his company's software home, confident that he could wrap up the job and earn valuable points with the boss. Once home, he couldn't boot up the software; he couldn't even insert the Macintosh program into the drive. Something seemed to be blocking the opening. Exasperated, he returned to work the next day with the work unfinished.

Later, a computer repairperson discovered the cause of the problem: Someone—my friend's two-year-old son was the primary suspect—had stuffed a credit card into the drive, jamming the works in the process. Once he had his credit card extracted, it was put to use paying for a hefty computer repair bill.

Toddlers and computers *can* coexist safely, but it will take some work on your part. If you plan to introduce your preschooler to computers, live by these two mottos: A place for everything and everything in its place, and no minors admitted unless accompanied by an adult.

If you abide by this basic advice, as well as the following reminders of computer-room etiquette, your child and your machine should be able to survive their first encounter.

MARIO PAGNONI, *a computer-science instructor, is the author of* Computers and Small Fries, A Computer-Readiness Guide for Parents of Tots, Toddlers and Other Minors, *published by Avery Publishing Group.*

ILLUSTRATION BY MONA MARK

NO EATING, DRINKING, OR ROUGHHOUSING ALLOWED

Remember that the computer is an electrical appliance and should be treated as such. Food and drink near disks, computer hardware, and preschoolers are open invitations to disaster. (Even post-schoolers have been known to spill coffee on various peripherals.)

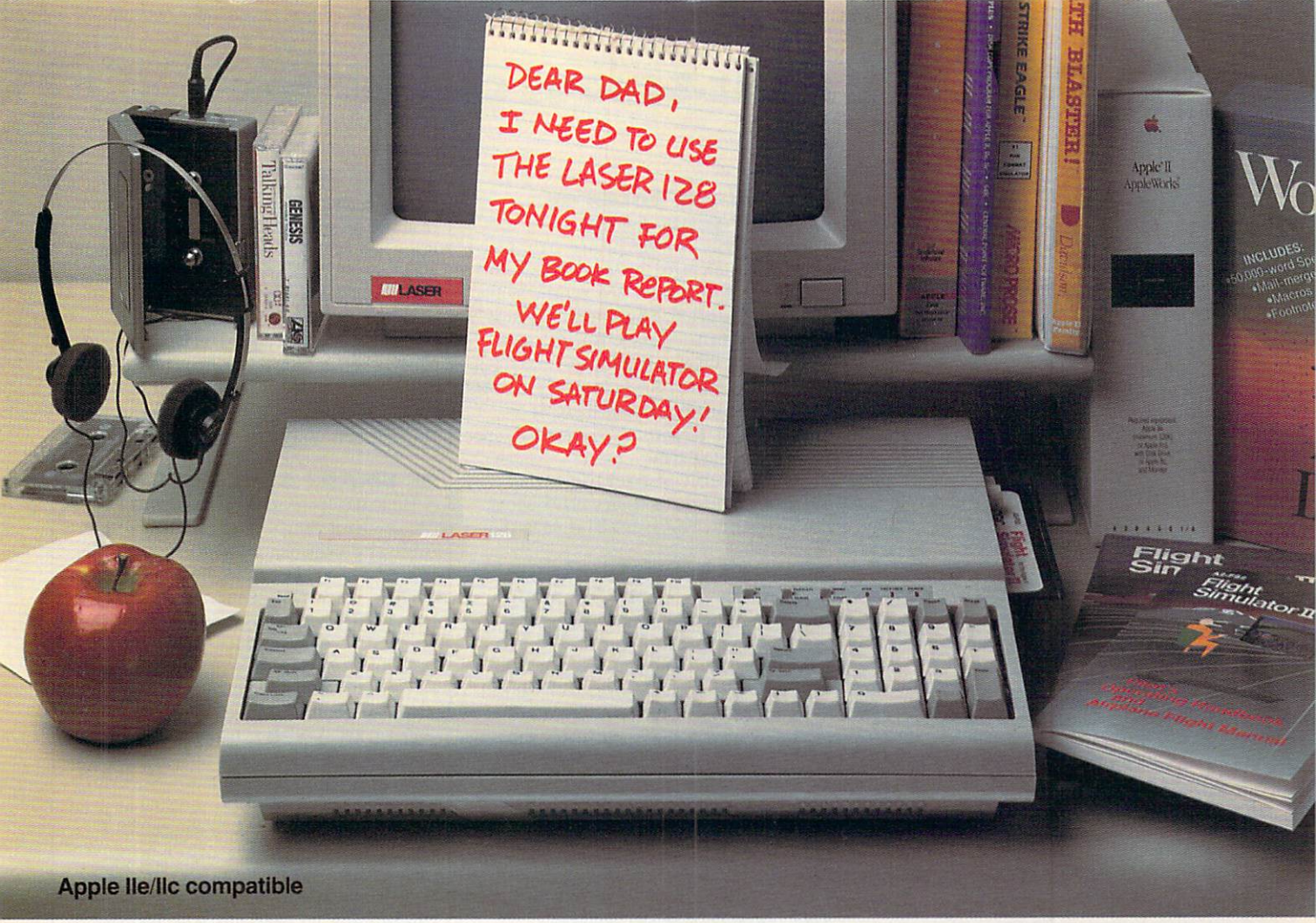
As for roughhousing, using terms like "easy does it" and "gently now" will clue toddlers to the kind of behavior that is expected around computers. If *everyone* in the family obeys the rules, children will learn proper computer-room decorum right from the start.

OUT OF SIGHT—OUT OF MIND

Keep things you don't want touched out of sight—in file drawers or other compartments. If you don't want your child to touch the disks, take them out of their attractive Muppets packages. Then your preschooler can fondle Big Bird's likeness to his or her heart's content. Put the disks in a key-lock container, lock it, and you can let the child fondle that for a while, too, until he or she loses interest.

Keep wires out of sight, as well. The easiest way to do this is to tape them to the back of the computer station or to the wall. Eliminating excess wire will prevent a child from tripping, tugging at cords, and pulling down peripherals. Some office-supply companies sell wire-storage devices that help keep the power-cord tangle under control.

To determine what's out of sight, get down to your child's level—eye level, that is. While you're at it, take a crawling tour of the room, placing taboo objects out of view. By doing this, you won't have to stifle your child's curiosity by repeatedly saying "NO!"



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The Laser 128 with all its features: built-in disk drive; 128K RAM (expandable to 1 megabyte); serial, parallel, modem and mouse interfaces; 80 column text mode; numeric keypad; and an expansion slot; makes for a pretty educated buy. When you do your homework on which computer to buy, you'll find the Laser 128 at the head of the class with value. For more information on the Laser 128 and the name of your nearest dealer, contact Video Technology Computers, Inc., 400 Anthony Trail, Northbrook, IL 60062, or call (312) 272-6760.

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HOME-SCHOOL CONNECTION

FOLLOW THE RULES OF FLOPPY-DISK CARE

Predictably, toddlers are innately adept at disk mutilation. When you think your children are ready, walk them through the various steps of careful computer use: handling a disk by its label, inserting it carefully into the drive, and closing the door. With the youngest children, it may be best to master each of these tasks one at a time.

Make a habit of backing up all program and data disks and store the original programs in a safe place.

NO TOYS OR PETS ALLOWED

Keep toys out of the computer room. Who knows what dangers (magnets, motors, or metal objects that may have become magnetized and could damage computer disks) lurk therein? Pets, too, are a computer room no-no. Computer equipment is too fragile, too costly to risk exposing to a frisky animal. The computer, mom and dad, brothers and sisters, and friends are enough playmates for this room.

POSITION EQUIPMENT WITH THE TODDLER IN MIND

Children can damage computer equipment—or hurt themselves—if you're not careful about your system's placement. For example, a curious child, while trying to tear off a piece of computer paper, can accidentally send a badly placed printer tumbling to the floor or onto his or her head. In addition, the print heads on some printers heat up to temperatures that can burn a child's skin. So, position computer components with such things in mind. Try to make the keyboard very accessible, the drives less so, and the printer hardest of all to reach.

One parent told me about a highly innovative and successful kid-proofing secret—he wrapped the entire keyboard in a clear plastic bag.

PURCHASE STURDY COMPUTER FURNITURE

Give your computer furniture a few good shoves from several different angles: It shouldn't shake or vibrate. It's also better to have rounded rather than sharp edges on all furniture, since bumps are better than cuts in the event a toddler falls. Don't try to pinch pennies when buying a table or desk; it doesn't make sense to spend a thousand dollars or more on computer hardware and $12.95 on a flimsy desk to support it. You may want to consider converting an old table or desk into a computer station. Remember to consider stability first—Aunt Martha's bridge table might be great for card games, but collapsible table legs, computers, and kids make for a dangerous combination.

BE SMART ABOUT SETUP

Be sure to place the computer table or desk against a wall to minimize the chances of a child knocking peripherals to the floor. Make certain, however, that the computer has breathing room. Some computers need free air space for vents that help to dissipate heat buildup.

You should also purchase a power strip (a device that accepts four to eight plugs) with a built-in surge suppressor. The strip will accommodate all the cords you'll need to plug in and protect against electrical power surges that could damage your hardware. Don't plug other appliances into the same outlet as your computer or power strip. Use plastic safety caps to keep unused electrical sockets hidden.

RADIATION

Color televisions and monitors produce radiation in many different forms. Experts, however, disagree as to just how harmful such exposure may be.

We know that color monitors emit more radiation than monochrome sets. (Color requires higher voltages.) Most experts agree that the farther you are from the source of radiation, the safer you are. And since radiation exposure is cumulative, the length of time that you are exposed correlates to the dose of radiation you receive. You may want to position your chair or bench as far from the screen as is practical.

You may want to consider purchasing a radiation screen (lead-impregnated acrylic safety shield). These shields are designed to be placed in front of the CRT, blocking harmful radiation.

Reconsider your safety precautions as your child progresses from one developmental stage to the next (for instance, crawling, walking, or climbing). The trick is to always stay one step ahead of your child. FC

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LESS IS MORE
Space-Saving Equipment for Cramped (And Other) Quarters

BY CHARLES H. GAJEWAY

Bell Atlantic's CompuTree

EDITOR'S NOTE: *This article on space savers will be followed by others in upcoming months. Future topics will include the latest in new personal copiers, facsimile phones, and multiline phones.*

Just as work seems to expand to fill the time allotted to it (Parkinson's Law), personal computers seem to sprout peripherals and cables that fill *all* the space allotted.

A quandary arises when you try to tame the computer's inclination to be a messy space hog while leaving it readily available for use.

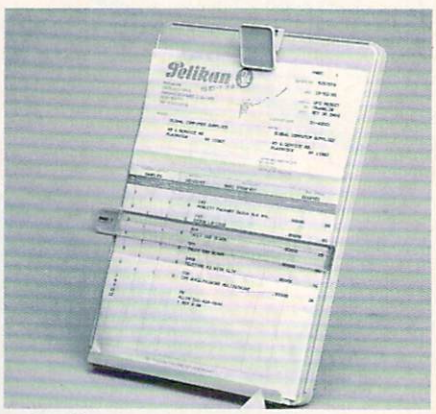
Thankfully, there is a wide range of specially designed furniture and accessories that minimize the space your computer system requires. Let's take a look at some of these "better ideas."

MOBILE CARTS

Do you have a desk that seems to sprawl across the room—littered with a computer and related manuals, disks, and paper? One solution may be to replace your desk with a computer workstation.

One of the most space-efficient types of workstations is the mobile cart, which can be rolled around—even through an ordinary-sized doorway. Most units stow all components and cables, and the system can be concealed when not in use.

Contributing editor CHARLES H. GAJEWAY *has set up a home office in three different locations.*



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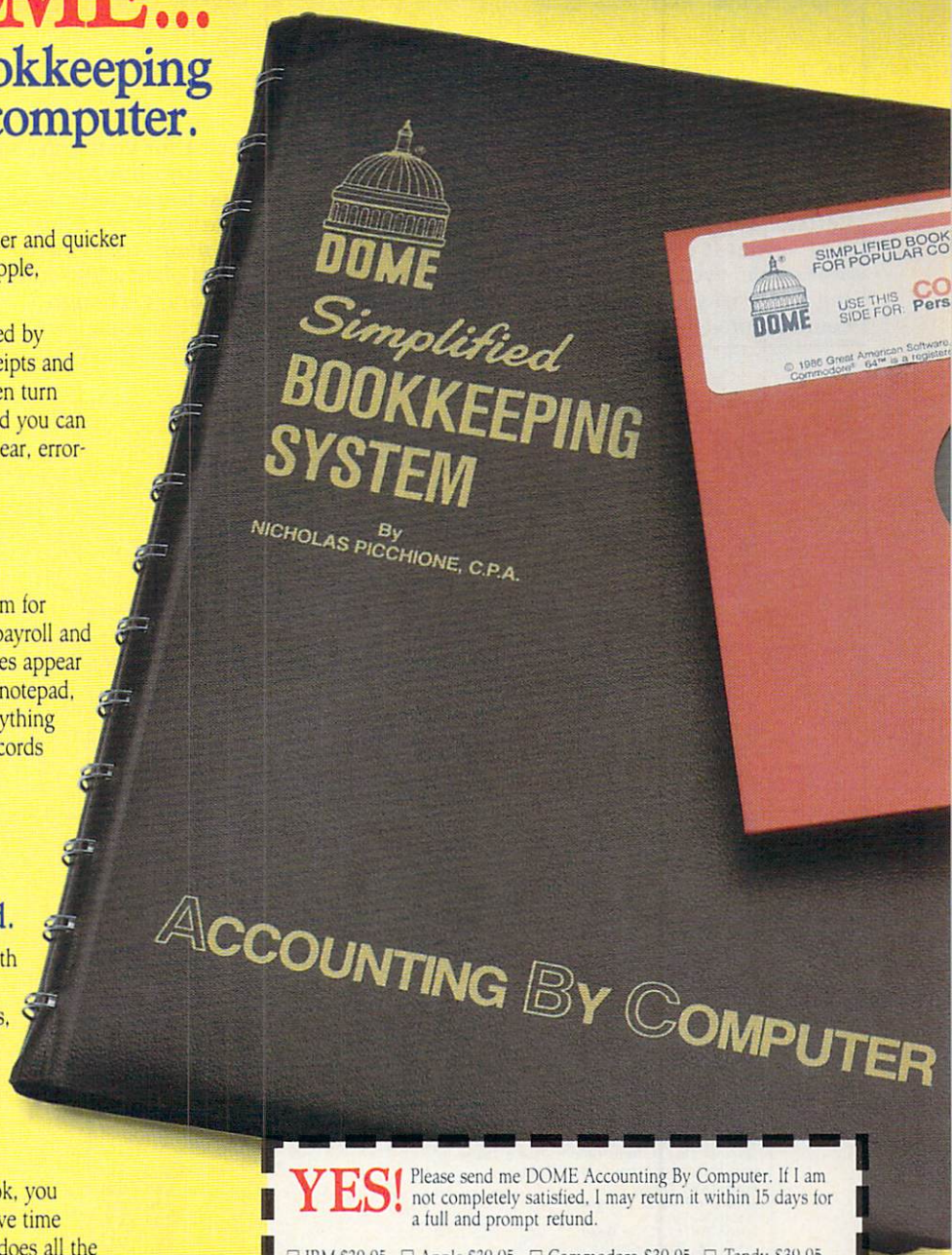

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CIRCLE READER SERVICE 14

(Many carts even feature locks to keep toddlers' fingers away from inky ribbons and destructible diskettes.) The main problem with a cart is that it makes equipment less accessible; even changing or adjusting paper in your printer can become inconvenient. And there's no room under the cart for your legs, so typing can also be uncomfortable.

Bell Atlantic and Inmac (*see "Computer-Supply Catalogs"*) carry full-height carts with doors that conceal all components and offer additional diskette/manual storage, though these can be somewhat expensive (up to $600). The best values I've seen in carts are the PC Work Center line from Global Computer Supplies (starting at $224) and the Inmac PC Cart ($249).

The tops of both carts hold the monitor and IBM-style CPU; there is also a slide-out shelf for the keyboard, with room for a printer and paper on the lower section. Neither has doors. The Global unit, unfortunately, will only accommodate keyboards up to three inches high, so that units like the Apple II Plus and IIe, Commodore 64, and Atari XE may not fit. The Inmac model affords a little more space for the keyboard, thus making it more flexible.

Another space-saving unit is the corner workstation that can make use of otherwise wasted space. Bell Atlantic carries a corner workstation called the PC Corner Work Center ($99), perfect for a Macintosh.

COMPUTER STANDS

Even smaller than the mobile cart is what I call the pedestal-style cart. This is a mobile stand (with either four legs or a true pedestal with a five-legged base) that is no wider than an IBM PC and can be stored in a closet or laundry room, yet easily and quickly moved to a convenient workplace. This cart even has an attachment that houses a printer on top (although some printers might make such an arrangement top-heavy).

Bell Atlantic has an outstanding selection and good prices for this type of storage. One of its fancier units, the CompuTree ($499), has "branches" with shelves that hold different system components. The shelves swivel and can be raised or lowered on a freestanding pole with a wheeled base (add $25 for casters). Inmac's Spacefinder is less expensive ($299), but requires stationary mounting.

HANDY GADGETS

One of the most important accessories for any workstation is a printer stand that lifts your printer and provides a paper path so that both feed and output stack directly beneath the printer.

Both Inmac and Bell Atlantic offer extremely heavy-duty space-saving printer stands for around $50. Another excellent value is Inmac's Re-

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fold printer stand (80- or 132-column; $30–$35), a vinyl-coated heavy-gauge wire unit.

Also handy is 3M's DataSaver diskette holder ($15) from Bell Atlantic and other dealers. This unit mounts on the side of your monitor, is shielded against magnetic fields, and provides easy access to ten 5.25-inch diskettes.

A copy stand that clamps to the rear of your desk or worktable is also an excellent accessory that adds workspace (and eliminates some neck and eyestrain). Inmac, Global, and Bell Atlantic all have units priced around $50; Global also has one that mounts to your monitor for $35.

COMPUTER-SUPPLY CATALOGS

Bell Atlantic Business Supplies (800) 523-0552; Global Computer Supplies (800) 845-6225; INMAC (408) 727-1970.

A power strip like Kensington Microware's MasterPiece ([800] 535-4242; $150) lets you neatly plug in all your peripherals and protects against power surges. The strip also enables you to tuck the cords away without worrying about access to the power switches, and it leaves one power cord for the entire system. MasterPiece Plus (also $150) will do all this, plus protect your modem from power surges and line noise. Global's Wire Keeper ($13) lets you coil a mess of cables into a small case.

IBM STORAGE TRICKS

The IBM PC-style computer with internal disk drives offers some intriguing possibilities—especially if you have a hard-disk drive and don't always need access to the disk drives. All of the catalog vendors mentioned carry kits that let you mount the system unit vertically on the floor—either next to or underneath your desk—and extend the keyboard and monitor cables so that they can be placed on the desktop.

A clamp-on monitor stand that suspends the monitor above the desktop is available from several vendors. A clamp-on monitor used in combination with a vertically mounted CPU can reclaim almost your whole desktop without taking up any additional floor space.

Keyboard drawers that go underneath the CPU and slide out for use make it possible to use your PC on a surface just deep enough to accommodate the CPU.

The computer-supply catalogs listed here are full of products to help you house your computer system; the product samples shown here are only a fraction of what's available. Many items may seem overpriced, but the products that I've seen and used are uniformly rugged and well-made. In most cases, your dollar buys quality. FC

SURGE PROTECTOR.

ZAP PROTECTOR.

Static buildup from the carpet near your computer can put 12,000 volts at your fingertips. When discharged, you only flinch. But your computer's memory can be jumbled, data scrambled, microchips permanently damaged. You can avoid zapping hardware, software, and yourself with Static Guard™. A periodic spray on furniture and carpet around your work station safely eliminates static and lets you avoid the consequences of a 12,000 volt discharge.

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CIRCLE READER SERVICE 2

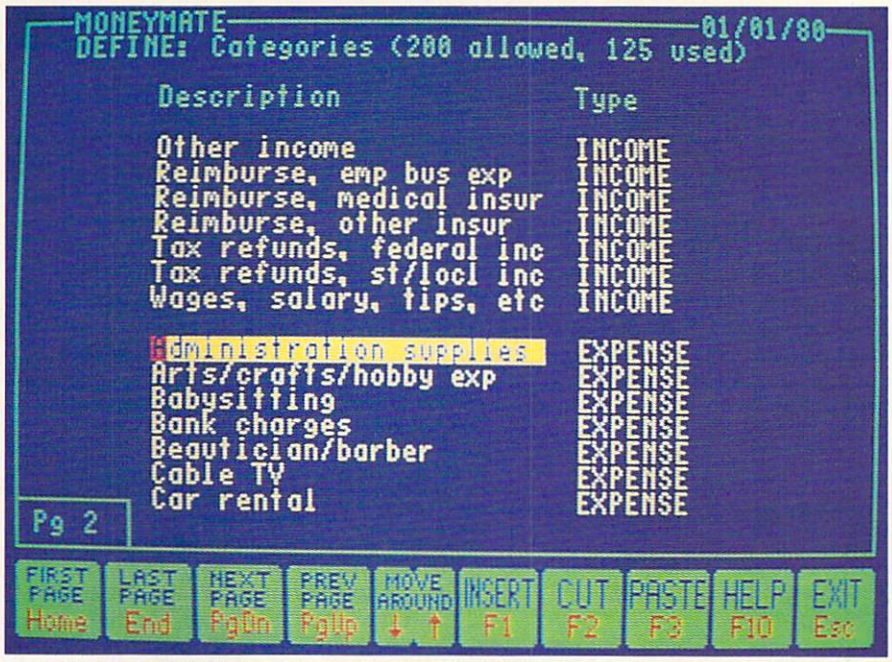
PERSONAL FINANCE

MONEYMATE: The Perfect Teammate for Your IBM

BY JUNE ROGOZNICA

At first glance, *MoneyMate* appears to be a lot of hype. The 13-by-22-inch package resembles a box for a Monopoly board game. But don't be fooled: *MoneyMate* is serious, sophisticated financial software. The only thing it has in common with Monopoly is that it may bring some fun to money handling.

The manufacturer, RealWorld Corp., touts *MoneyMate* as "home financial software for people with better things to do." These individuals are exactly whom the program will serve best. While many people can use a pencil and paper to track and record financial transactions, *MoneyMate* eliminates time, tedium, and inevitable headaches.



***MoneyMate*'s CATEGORIES section allows you to enter or change the names of up to 200 categories in your budget. Help screens can be called up at any time to describe a feature.**

SAVE COUNTLESS HOURS

Perhaps *MoneyMate* is best described as a bookkeeping assistant. You'll still need to collect the paper—bank and credit-card statements and dividend reports, for instance—and input the data. But, *MoneyMate* will do the time-consuming sorting, calculating, and reporting—accurately and completely. The program lets you track bank-account and credit-card balances, reconcile bank statements, print checks, and determine the value of assets and liabilities.

MoneyMate's 150-page-plus user guide is thorough and easy to read. It takes you through the 11 setup steps, from installing the program disks, to setting up your monitor's colors and contrast, to defining your credit cards, to calculating your net worth. Graphics are used throughout the manuals to illustrate what your screen should look like at specific points in the program, and a brief glossary is available for quick reference to basic computer and financial terms, like *alphanumeric* or *marketable securities*. In addition, once booted, the program offers help screens at every stage.

HARMONIZE YOUR INCOME AND EXPENSES

For most people, the most difficult facet of tracking and planning your personal finances is setting up a system that is logical and useful: Financial planning demands organizational skills. *MoneyMate* has that organization built in. For example, it offers up to 150 predefined categories for income, assets, expenses, and other related entries. And you can personalize the program by changing the categories to words or terms *you* find easier to remember or, perhaps, categories more suited to your situation. For example, you may change the GROCERIES category to JRMARKET if that's where you do all your food shopping. Or, if you itemize your expenditures, you may want to subdivide the existing ENTERTAINMENT category into PLAYS, MOVIES, and MUSEUMS for a better idea of where your money goes.

PREPARE FOR THE TAX SEASON

One of the program's highlights is the tax-report section. It lets you designate whether or not an entry is tax-related and sorts the items according to the appropriate Internal Revenue Service form and section thereby easing the process of tax-preparation. If you have a small home business, you can modify the categories for income and expenses as well as tax codes. For example, if you're self-employed, you'll probably want to sort your records using the code S-C/2-DED for deductions to be included in Schedule C, Part II.

While *MoneyMate* is simple to use, its capabilities are far from simplistic. For assets you can indicate ORIGINAL VALUE as well as CURRENT VALUE, recording what you paid for an asset versus what it's worth today. An example: If your Florida vacation home appreciated $20,000 in the five years since you purchased it, you'll want your NET WORTH to reflect today's value of $80,000 rather than $60,000.

Perhaps *MoneyMate*'s best quality is that it eliminates just about all the guesswork for the user. And, certainly, when your finances are involved, you want to leave nothing to chance.

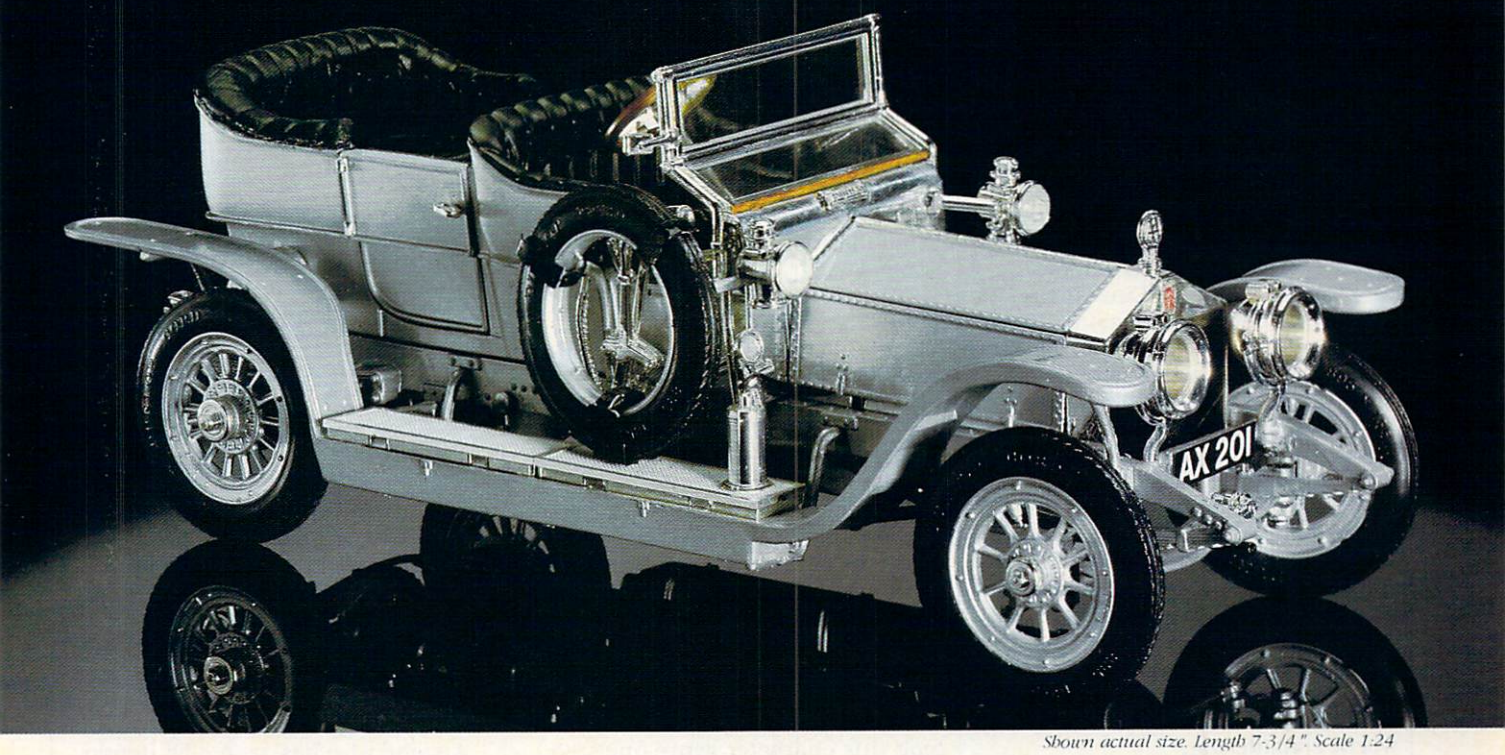
MoneyMate, published by RealWorld Corp. (P.O. Box 2051, 282 Loudon Road, Concord, NH 03302; [603] 224-2200) sells for $169. It requires an IBM PC or Personal System/2 or compatible with a minimum of 256K and PC-DOS or MS-DOS (version 2.1 or later). FC

JUNE ROGOZNICA *has written articles on finance for* Money *magazine and* The New York Daily News.

EDITOR'S NOTE: *This is the second in a series of articles that review personal-finance software. Last month we reviewed* MacMoney.

PHOTOGRAPH BY KAREN KANE

Rolls-Royce Motors demands nothing less than perfection.



Shown actual size. Length 7-3/4". Scale 1:24

THE SILVER GHOST

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The 1907 Rolls-Royce Silver Ghost. It advances a revolutionary concept in the fascinating and popular field of model car collecting. Perfection.

A scale re-creation with such convincing standards of detail, quality and precision that Rolls-Royce Motors has recognized it as the *authorized* die-cast model of The Silver Ghost.

And so scrupulously accurate that company officials have verified the model for authenticity.

Named for its silver-plated trim, metallic-silver paintwork and extraordinary silence, The Silver Ghost offered luxury and performance previously unknown. And the prototype for this die-cast model is based directly on first-hand studies of the original.

Steel dies taken from the prototype are used to cast the more than 127 components needed to build a single model.

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What price perfection? A custom model of this quality would cost hundreds or even thousands of dollars. But The Silver Ghost is just $120, and payable in four installments of $30 each.

Crafted and imported exclusively by Franklin Mint Precision Models, it's available by direct application only. So be sure to order by August 31, 1987.

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172

ENTERTAINMENT

VIDEO GAMES REBORN!
A Close Look at the New, More Sophisticated Game Machines

BY STEVE MORGENSTERN

If video games are dead, why do I continue to see ads for game machines on television? It must mean that sales are up or at least holding steady. No company that enjoys making a profit would invest the kind of money that television ads require into a stagnant business. So that's why, with the help of friends and neighbors, my family has spent the last few weeks studiously evaluating the three major game systems currently on the market.

I love computer games and have spent many hours evading Bungeling guards, mapping dungeons, flying against enemy fighter planes, and accruing hit points. But dedicated video game systems offer something extra. Even if you already own a computer, a system born and bred solely for entertainment is worth considering.

EXCEPTIONALLY EXCITING SIGHTS AND SOUNDS

Nintendo led the video game revival in 1985, followed closely in 1986 by Atari with its Atari 7800 and Sega with the Master System. All three new machines were designed for fast, smooth animation, detailed graphics, and rich, varied colors—and they deliver. The detailed character animation is excellent, particularly in the Nintendo and Sega units. When there is an especially large number of objects on screen at once, you may still notice traces of "flicker," the annoying blinking that occurs when the system is being pushed a little too hard. By and large, though, the image quality is rock steady.

The sound is first-rate as well, with bouncy, hummable background music on many games. Sound effects played a minor role in most of the games we tried, consisting mainly of interesting scrunching, zapping, and boinging. *F-16 Fighting Falcon*, however, for the Sega system, is an exception. We cranked the television up high to enjoy the realistic fighter-plane sounds produced by this surprisingly sophisticated flight simulator/air combat game.

STEVE MORGENSTERN *is a contributing editor for* FAMILY COMPUTING.

GAMES PEOPLE PLAY

The video game software selection available today falls predominantly into traditional arcade categories. There are racing games, martial arts contests, assorted sports simulations, and target-shooting games for the systems with guns. Several games provide animated on-screen characters who run, leap, jump, punch, shoot, dodge, duck, and otherwise conquer oncoming foes. This can be called the "*Donkey Kong* school" of game software, which requires more than just fast hands.

Two of the best games we tried took this character genre one step further. Instead of playing a single screen, or rotating between two or three with increasingly tenacious villains on the attack, *Super Mario Bros.* (from Nintendo) and *Alex Kidd in Miracle Land* (from Sega) present your on-screen hero with a series of different worlds to explore. New bad guys appear periodically. There are hidden bonuses and passages to uncover, treasures with mysterious powers to discover, and different landscapes and seascapes to traverse. These are games of discovery, and while they don't pretend to offer the mental challenge of a computer text-adventure game, it's very satisfying to finally reach new and unfamiliar sections of the game world.

While the three advanced gaming systems have definite similarities, each offers distinct advantages and disadvantages. Let's examine them one by one.

NINTENDO ENTERTAINMENT SYSTEM

The Nintendo Entertainment System offers excellent high-resolution graphics, good sound, and an impressive selection of game software. The system is offered in two configurations. The Deluxe Set package (list price $180) includes the Control Deck base unit, two controllers, the Zapper light gun, R.O.B. the robot, and two game cartridges. A more modest system offers the Control Deck base unit, two controllers, and a single cartridge for $99 list price. Software cartridges sell for $20-$35.

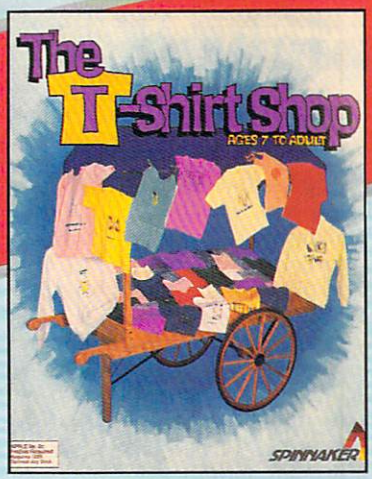
The Nintendo Entertainment System

Anyone who has seen a Nintendo ad on television would think that R.O.B. is the heart of the system. Not so. R.O.B. (acronym for "Robotic Operating Buddy") is an ingenious idea. The freestanding battery-operated unit is about 10 inches tall, has arms that can be raised and lowered or moved from side to side, and "hands" that can open and close. You place R.O.B. in front of your television, point his photosensory "eyes" at the screen, and his movement is then controlled by light signals from the television.

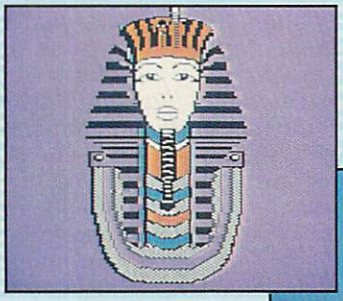
While R.O.B. is a cute little guy, there isn't much you can do with him. There are only two game cartridges available that interact with R.O.B., and neither generates much excitement.

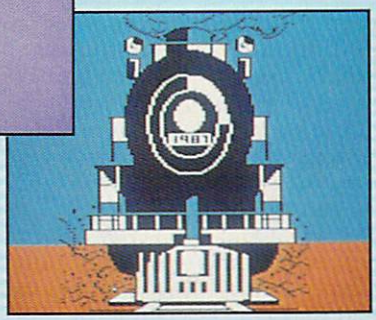
The Zapper light gun, on the other hand, works reasonably well and is supported by a variety of shooting games. For my money, I would bypass R.O.B., buy the simpler Control Deck package, and consider buying the Zapper separately ($25). This choice is especially appealing since the *Super Mario Bros.* cartridge—in my house, definitely the hands-down favorite for the Nintendo system—is included with the basic Control Deck package but not with the

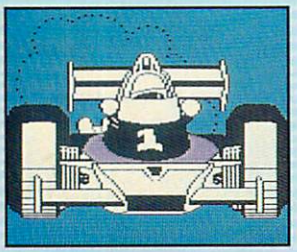
T-Shirt Shop™



How to Design Your Own T-Shirt in Five Easy Steps







1 **Get Started**
The first thing to do is to boot up T-Shirt Shop. You'll be greeted by an easy to understand menu that lets you see everything the program can do at a glance. You can LOAD pictures from the picture disk, DRAW your own pictures, TYPE in any slogan you can think of, and COLOR in your pictures.

2 **Choose a Graphic**
Now choose LOAD from the menu. You can choose from more than 50 supplied graphics. Hollywood celebrities, political and historical figures as well as plants and animals represent some of the categories included. For a change, you can draw your own picture. In either case, once you choose a picture, the outline will appear on the screen, ready to be colored.

3 **Paint It**
Here's your chance to show your artistic ability. Using the palette of colors, the brushes and the spraycans, you can paint a rainbow of color – you can even color in the picture to match your eyes! If you want, the program will automatically paint the picture with colors you choose.

4 **Add Type**
You've got a beautifully colored picture now. Go to the TYPE section, and choose from a variety of type styles. Name your picture, or attach some absurd sayings. Create catchy political slogans, humorous sayings, or something incredibly tacky.

5 **Print It**
Print your shirt design onto the special iron-on transfer paper (free sheets are included). With T-Shirt Shop, what you see on the screen is exactly what you'll get on your t-shirt. The paper will work with any ribbon – even in color – and will transfer perfectly to any t-shirt. Print your design, iron the transfer onto your shirt and you're in business. Impress your friends! Wear them into the office, to the beach, or to a wedding. T-shirts make great gifts, too!

T-Shirt Shop is the only program that allows you to design, paint and create your own t-shirts. In just minutes you'll be wearing your creations. Be the first on your block with a custom designed t-shirt, sweatshirt or even underwear...from T-Shirt Shop.

Available at fine software dealers

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CIRCLE READER SERVICE 38

SPINNAKER®

Deluxe Set system.

Nintendo has produced an impressive selection of software, much of it adapted from the company's own arcade titles. An interesting attempt at more flexible game playing is evident in the programmable series, which allows players to design either their own race courses (with *Excitebike* and *Mach Rider*) or create a building to demolish (in *Wrecking Crew*). The programmability is a flawed feature, however, since you can't save your creations to disk as you could with a computer game, but it's still noteworthy.

Nintendo recently announced licensing agreements with several independent arcade game manufacturers who will produce home versions of their hit titles for the Nintendo system. This, plus Nintendo's strong release schedule, promises a steady stream of interesting new software for the future.

SEGA MASTER SYSTEM

This is one slick system. We thought that the graphics were the best of any system tested, and the shooting games were extraordinary. The Light Phaser gun feels good in the hand and works smoothly. More

The Sega Master System.

important, it allows a high degree of accuracy and excellent player feedback. When shooting at the target-range dummies in *Marksman Shooting*, for example, you actually see tiny bullet holes in the paper targets precisely where you "shot" them.

The Sega Master System (list price $150) includes the Power Base unit, two controllers, the Light Phaser gun, and a dual game cartridge with the *Hang On* motorcycle racing game and a handsome light-gun shooting game called *Safari Hunt*.

Sega software comes in two forms. The Sega Card is about 2-by-3.5 inches and wafer-thin—you can fit a stack of them in your shirt pocket. Though limited to 256K of memory, some of our favorite software came in this form, including *Teddy Boy*, a lightning-fast character shoot-'em-up through a series of bizarre mazes; the *F-16 Fighting Falcon* flight simulator game; and a very challenging *Super Tennis* game. Card software lists for $30.

Most Sega software comes in cartridge form ($35 list price). Most cartridges contain an impressive 1,048K memory; recently, a new Two Mega Cartridge with 2,096K was introduced (with an adaptation of the popular arcade game *Space Harrier*). Strong cartridge software titles include the *Black Belt* martial arts game; *Choplifter* (adapted from the more complex arcade version rather than the computer original); and *Fantasy Zone*, a cartoony scrolling shoot-'em-up with bright colors and infectious music.

Sega itself has chosen to produce all software for the system rather than license outside developers, which might limit new title availability. For now, though, the company has announced an ambitious schedule of software releases, including a number of new sports games and the cooperative multiplayer arcade game *Quartet*. Planned system add-ons include 3-D glasses (to work with special game cartridges), a graphics tablet, and a trackball controller.

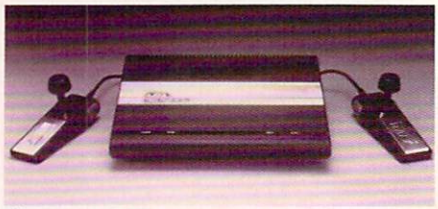
ATARI 7800

Even though the Atari 7800 was introduced to the public in 1986, the design of both the system unit and most of the currently available software was completed in 1984—just in time to be put on the shelf when Jack Tramiel bought the company. The relative age of the system shows in its graphics, which are far superior to older Atari game machines, but not up to the standards of the Nintendo and Sega systems.

At the same time, there are several points in favor of the 7800. If you like classic arcade games, you will find several excellent choices here, including *Xevious*, *Pole Position II* (packed with the system), *Ms. Pac-Man*, and the disarmingly silly *Food*

COMPANY CONTACTS

Atari Corp.: (408) 745-2000
Nintendo of America, Inc.: (206) 882-2040
Sega of America, Inc.: (800) 872-7342



The Atari 7800 game machine.

Fight, in which Charley Chuck faces an army of hostile chefs with weaponry ranging from watermelon and green peas to the ever-popular custard pie.

Though the graphics may not be as sensational as on the competition, the play action is just fine. The system is clearly capable of displaying as many animated on-screen characters simultaneously as can fit on the screen, as proven by the white-knuckle rendition of *Robotron: 2040*.

While the Atari system does not offer a light gun, it is the only one of the three with full-size controllers. Both Sega and Nintendo provide tiny rectangular control pads, about 2-by-5 inches, with two fire buttons and a directional pad for movement control. Their accuracy is fine, but they're too small to be comfortable. The Atari 7800, on the other hand, comes with two joysticks that fit comfortably in the palm and give you something to grab when steering the on-screen characters.

The other area in which the Atari system excels is price, with the system unit less than $90 list, most software under $10, and even new titles priced at less than $20, as compared to prices up to $35 for the competition.

Atari has chosen an interesting strategy for its future software release plans. By licensing proven computer software hits and releasing them on cartridge (including *One on One Basketball* from Electronic Arts, *Karateka* from Broderbund, and *Winter Games* from Epyx), Atari will bring the best of computer gaming to those folks (we all know at least a few) who are absolutely not interested in purchasing a computer, but love to play electronic games.

WHY BOTHER?

Most FAMILY COMPUTING readers already own at least one computer. The others are seriously considering buying one. Since there are plenty of game programs on the market for computers, why bother with a dedi-

cated video game system?

There are several possible reasons. First, if you like arcade-style action, the quality of the games on the dedicated machines is far superior to almost anything available for your computer. Only the Amiga and the Atari ST computers come close, and while each has a few isolated arcade-style games that show off the system, neither has the range of action-game software available with any of the dedicated game systems.

Second, the game machines are convenient. They can sit by the television without taking up much space or be carried easily from room to room. Most of us keep our computers in a spot where we can get some work done. A game machine goes anywhere there's a television and the desire for some entertainment.

The game systems are particularly convenient if you have kids in the house. There are no fragile disks involved, just durable cartridges. A game machine can eliminate competition for time on the computer between family members who have serious applications to pursue and those who want to blast aliens to smithereens.

There is also a low intimidation factor involved in video games, which makes them ideal for socializing. Even friends who find computer games too complex can grab a controller and play a video game. And since the games don't go on for hours on end, it's feasible to wait your turn to play without growing old in the process. Many games are even fun to watch over someone else's shoulder.

Target-shooting games with a light gun are unique to video game systems and can be lots of fun.

Finally, while the investment is significant, it is far less expensive than purchasing another full-fledged computer, especially when you consider that cartridge-based software eliminates the need for a costly disk drive.

As for me, I'll still boot up the computer when I have time on my hands to explore another dungeon in *Bard's Tale II* or the patience to deal with the intricacies of *Balance of Power*. When I'm just looking to take a break for a few minutes, though, or want to enjoy some friendly competition with the whole family, I'll head for the den and turn on a video game system. FC

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"PC-Write is now widely considered a competitor to such expensive programs as Word Perfect, Microsoft Word, *and* Xywrite III."
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TELECOMPUTING

ELECTRONIC RESEARCH

Does Your Boss, Client, Kid, or Spouse Have a Question? Go On-line and Look It Up!

BY SUSAN K. DUNMAN

If you were asked the following questions, where would you go to find the answers?

- My boss wants to buy a particular software package and asked me to find out about it. Where can I locate some reviews?
- I am a high school senior and need to decide on a college to attend. Where can I find a comprehensive listing?
- Our business is planning a new direct-mail campaign. I need to develop a mailing list of potential customers. Where should I begin?
- My mother has just been diagnosed as having Alzheimer's disease. A new drug was suggested for treatment; where can I get information about it?

You can answer all of these questions by tapping into the incredible amount of information available from electronic data bases. There's a data base to cover virtually every subject. An example of this diversity can be seen in the data bases searched to answer the above questions: Microcomputer Index, Peterson's College Database, Dun's Electronic Yellow Pages, and International Pharmaceutical Abstracts.

Generally, you would subscribe to a data-base vendor (or data bank)—such as DIALOG or BRS— that allows access to a range of data bases. The equipment you need for access is a computer (or dumb terminal), a modem, telecommunications software, and a telephone line.

An electronic data base is not unlike a data base that you might set up at home—except that it can be searched from afar with a modem. Bibliographic data bases, the most common type, contain descriptions of published literature. Each description is organized as a record, and each record has a certain number of fields. By searching for the right field, you can locate a topic of interest.

For instance, fields in a bibliographic record might include TITLE, AUTHOR, PUBLICATION DATE, DOCUMENT TYPE, DESCRIPTORS, and IDENTIFIERS.

A TRIAL SEARCH

Say a researcher wants to know what articles have been published in FAMILY COMPUTING about electronic bulletin boards. This search is very simple because there are only two main conditions—a subject and a journal title. This is what the completed search looked like:

1) S JN = FAMILY COMPUTING
S1 695 JN =FAMILY COMPUTING
2) S BULLETIN(W)BOARD?
S2 529 BULLETIN(W)BOARD?
3) S S1 AND S2
S3 6 S1 AND S2

Here's an explanation of the search, which was performed on the Microcomputer Index ([415] 961-2880) offered through DIALOG. In the first step, the command was given to search for all articles published in the journal (JN), FAMILY COMPUTING. The system located 695 articles in that "set" (S1).

In step 2, the command was given to search for the words *bulletin* and *board* together (W indicates "with")—in any publication. The "?" after board is a wild-card character that will find *board*, *boards*, and *boarding*. There were 529 articles that met this requirement.

The third step truly shows the power of on-line searching. By using the logical operator *and*, the system is required to search for records that meet both conditions (FAMILY COMPUTING from SET 1, and BULLETIN BOARDS from SET 2).

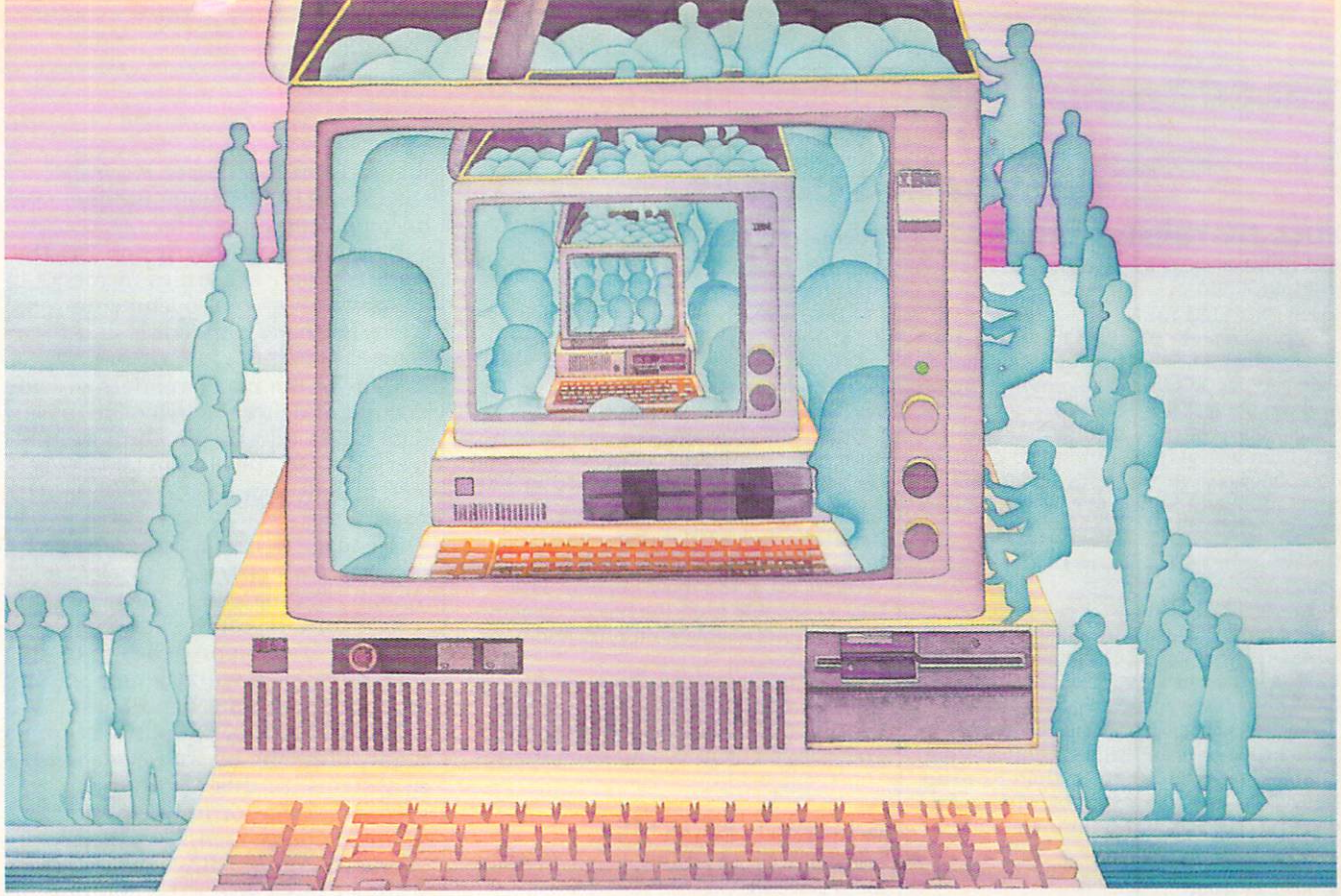
Six records satisfy both conditions (S3). The findings can be printed out in various formats, ranging from only the title to the complete bibliographic citation with abstract and indexing terms.

DATA-BASE VENDORS

Each data-base vendor has its own collection of data bases. While there

SUSAN K. DUNMAN *is a reference librarian at Murray State University in Kentucky. She specializes in on-line data-base retrieval.*

ILLUSTRATION BY ROLLA HERMAN



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CIRCLE READER SERVICE 9

DATA-BASE VENDORS

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BRS (Bibliographic Retrieval Service)
(800) 468-0908
(518) 783-1161 (in NY)

Approximately 100 data bases cover a broad range of fields, including agriculture, business, education, engineering, and medicine.

PRICE: BRS offers four different subscription levels. One level, called open access, charges $35 per hour of connect time, plus data-base and communication fees.

DIALOG Information Services
(800) 3DIALOG
(415) 858-2700 (in CA)

The largest of the data-base vendors, DIALOG provides access to over 300 data bases that cover all subject areas. DIALOG has offices in seven countries.

PRICE: Yearly subscription fee of $25. Data bases have individual connect-time charges, from $36 to more than $150 an hour. There is also a variable charge for each record retrieved from the system.

Mead Data Central/Nexis
(800) 227-4908

A general information and news service that offers full-text retrieval from more than 160 magazines, newspapers, and news wires. Approximately 40,000 full-text articles are added each week.

In addition to Nexis, Mead also provides a collection of legal data bases (Lexis) and medical data bases (Medis) for professionals in those fields.

PRICE: Mead's rate structure varies, but the hourly connect charge is $32. Search fees range from $7 to more than $30.

NewsNet
(800) 345-1301

Specializes in newsletters and includes the complete text of more than 300 newsletters and wire services that cover 35 major industries and professions. One-fourth of the collection is not even available in print format. More than 3,000 articles are added daily, and some publishers update files three or four times each day.

PRICE: Subscription fee of $15 per month or $120 per year. On-line charges begin at $60 an hour. Users may also be charged additional premiums if they don't subscribe to the printed equivalent.

VU/TEXT
(800) 323-2940
(215) 574-4400 (in PA)

Provides full-text articles from 35 national and regional newspapers. Also provides full-text of selected journal and news-wire services.

PRICE: Customers who guarantee $60 worth of usage per month pay a $75–$85 per hour connect-time fee. Or users can elect to pay a $10 monthly maintenance fee and hourly connect-time charges of $90–$100.

MENU-DRIVEN VENDORS

BRS: After Dark (BRS Information Technologies)
(800) 468-0908
(518) 783-1161 (in NY)

Offers 65 of the parent system's most popular data bases. Features simplified commands and menu assistance.

PRICE: One-time subscription fee of $75. A monthly minimum charge of $12. Connect-time charges range from $6 to $30 an hour.

Knowledge Index (DIALOG)
(415) 858-2700

Offers 60 of the more popular data bases available from the parent system, DIALOG. Accessible on nights and weekends.

PRICE: One-time sign-up fee of $35. (Includes two free hours of search time.) Connect-time charge of $24 an hour. There are no monthly minimum charges.

GATEWAY SERVICES

EasyNet
(800) EASYNET
or (800) 327-9638

Provides access to 13 different vendors. Sign on by dialing (800) EASYNET. The system prompts users with questions that help them develop search strategy and select data bases. Then the system connects to the appropriate data base and runs the search.

PRICE: $8 per search for up to 10 citations. Connect fee of 20–25 cents per minute. Some data bases may require an extra surcharge. Offers direct or credit-card billing.

InfoMaster (Western Union)
(800) 247-1373

Access to over 800 data bases through a number of data-base vendors. Offers the same type of service that EasyNet does.

PRICE: $25 annual subscription fee. Connect fee of $9 per hour if local access, $21 per hour via WATS number. Charge of $8 for display of the first 15 titles, plus one full-text record if the data base is full-text. If the search is on a bibliographic data base, then for $8 you can retrieve the first 10 citations. If the search doesn't produce citations, the search fee isn't charged.

IQuest
(800) EASYNET
or (800) 327-9638

Available via CompuServe. IQuest offers a service similar to EasyNet's.

PRICE: There is a $7 search charge for the first 15 citations of full-text articles or the first 10 bibliographic citations. CompuServe subscribers who access IQuest are also billed at standard connect-time rates.

may be some overlap in coverage, each vendor's system is unique. *(See accompanying list.)*

Payment of a subscription fee (the general practice) entitles members to a password, system documentation, and a listing of data bases and their general content.

Many of the major vendors provide document delivery service for those data bases that do not contain full-text articles. The charge for this service usually averages from $5 to $15 per article.

Because electronic research is expensive, it's important to select a system that matches your needs, interests, and research skills. There are three basic approaches to on-line searching, each with its own set of advantages and disadvantages.

The first type of data-base searching involves the use of **command-driven** systems. In this environment there are fewer (or no) help screens, multiple-choice menus, or other pleasant hand-holding devices. The searcher must select the appropriate data base, formulate the correct search strategy, and translate that strategy into proper system commands. The BRS and DIALOG systems are good choices for full-featured searching.

The second option is a **menu-driven** system. The BRS: After Dark (a subset of BRS) and Knowledge Index (a subset of DIALOG) systems incorporate menus and simplified commands that make searching much easier.

Of course, menu-driven systems have trade-offs. They offer fewer data bases and slower, less flexible searching than their parent systems.

The final option is a **gateway** service. Gateway services such as IQuest, EasyNet, and Infomaster offer access not only to a variety of data bases, but also to a number of different data-base vendors.

Gateways provide search-assistance features to help even the most faint-hearted. After a search request is made, the system selects the most appropriate data base for the search, connects to the vendor offering the selected data base, and runs the search.

On-line searching is not for everyone, and it's not a cure for all research woes. But it does offer a unique approach to finding information—another opportunity for your micro to help tackle old problems in new ways. FC

MACHINE SPECIFICS

NEWS, OPINIONS, QUOTES, & RUMORS ABOUT YOUR FAVORITE COMPUTER

APPLE

BY CHARLES H. GAJEWAY

The major news from Apple concerns the Macintosh SE, the Macintosh II, and the release of updated *System/Finder* software. The Macintosh line now offers a machine for almost any purpose, from a 512K machine to an 8MB multiuser business unit. The Macintosh II has expansion slots (like the Apple II and IBM PC lines), mind-boggling speed, and jaw-dropping color graphics.

With a list price of around $5,000 for a reasonable configuration, the Mac II is probably most appropriate for corporate or high-power home-business use only, but it's a must-see for everyone. The IIGS was a gee-whiz product, but the Mac II leaves you speechless. Go see it, by all means; it should be at your dealer's store as you read this.

The SE is less exciting, but it's a true workhorse. With the same 256K system ROM as the Mac II—plus an expansion slot and room for a second internal floppy or hard-disk drive—the SE offers a substantial increase in speed and power over the Plus. The $2,899 list price represents a good value.

New System/Finder. The new *System/Finder* release (4.0/5.4) is actually an interim product that Apple has made available primarily to support the SE and Mac II while a more compact version is readied for summer release. While there are some significant improvements and corrections, the new software has expanded to the point where it occupies most of an 800K diskette. (Mac owners who have not upgraded to the 512e configuration and still have 400K disk drives should read the handwriting on the wall and change before the parts become hard to obtain.)

My advice is to stick with the 3.2/5.3 *System/Finder* until the polished version is available. But get the new printer drivers. (They are part of a *System* update disk.) They run faster and cure several annoying bugs, including the infamous "squashed-line" syndrome on the ImageWriter.

GEnie. I've found the CMUG Macintosh RoundTable on GEnie to be an invaluable resource for Macintosh owners. While the Macintosh Forums on CompuServe are also active and valuable, Mac owners and developers abound on GEnie; there are also any number of gems tucked into the software library. And for downloading software, the cheaper 1200-baud rates on GEnie ($5.00 per hour versus CompuServe's $12.50 per hour) save money.

CHARLES H. GAJEWAY *can be reached on CompuServe* (ID: 73357,3577) *or on GEnie* (ID: C GAJEWAY).

ATARI

BY JOHN J. ANDERSON

GFA BASIC is the most powerful, easy-to-use version of BASIC for the ST available. (Originally published by GFA Systemtechnik in Germany, it's now distributed in the United States by Michtron; [313] 334-5700.) *GFA BASIC* taps into most of the ST's powerful features (sound and mouse, for example), so that it's possible to write a program in *GFA BASIC* that doesn't betray the fact that it's not written in C, Forth, or Assembly. Huzzah! It lists for $79.95. Double huzzah!

GFA BASIC sports no line numbers and allows exactly one command per line. This may seem like a throwback, and I can tell you that it does take some getting used to. But if memory isn't a problem (and it shouldn't be on the ST), the result is code that's much easier to follow.

Real-Time Editor. *GFA BASIC*'s editor has its nuances but, on the whole, is a pleasure to use. It's what I call a "real-time" editor: You can change the code on a line, click on RUN, and watch the modified code being executed. INSERT, DELETE, BLOCK MOVE and COPY, SEARCH and REPLACE—all work exhilaratingly well.

True, marking blocks and manipulating them is a two-step process and can seem a bit awkward. To move up or down a page you click the mouse on the menu bar, which is a little distracting, at least to start with. But the editor is smooth and powerful. It even features a pseudo-direct mode, where commands can be entered command-interpreter style.

Error-trapping. Error messages in *GFA BASIC* are always full-text and usually direct you to the problem. The interpreter is quite smart and can often accept a line that has been incorrectly entered, fixing the mistake as it goes (as long as the mistake is a minor one). As an example, a line you enter as ?AT (2,2)"TEST" will click in as PRINT AT (2,2);"TEST" and execute correctly. Insertion of the semicolon especially impressed me.

GFA BASIC's command set is extremely complete. You'll discover it's replete with commands you didn't know you needed, but will happily learn to use. Among these are commands for graphics, sound, menus, windows, mouse, machine code calls, drive control, time and date, directories, file manipulation, various input formats, a range of loop formats, string handling, error trapping, I/O channels, PEEKs and POKEs, screen manipulation, READ-DATA manipulation, pointers, and traces.

C Routines. The EXEC command allows you to load and execute a non-BASIC ST application and run it from within a *GFA BASIC* program. The C: command calls and runs a routine written and compiled in C.

Included on the disk with *GFA BASIC* is a program that strips line numbers from *ST-BASIC* programs for conversion to *GFA BASIC*. The program helps show you where you'll need to do some custom tailoring.

So it becomes clear that *GFA BASIC* is an excellent program and an excellent programming language. It brings BASIC to the ST in a manner truly worthy of the machine.

JOHN ANDERSON *can be reached on CompuServe* (ID: 76703,654).

COMMODORE

BY SHAY ADDAMS

Originally developed by a company that specialized in joysticks, the Amiga has come full circle—with the announcement of an agreement between Commodore and Bally that al-

MACHINE SPECIFICS

lows Bally to use Amiga graphics technology in its next wave of arcade games. Commodore acquires the rights to any Bally video games developed for the Amiga; the company no doubt hopes such software will boost sales for the new Amiga 500.

Does this mean Commodore's latest attempt at a marketing strategy is to position the 500 as a game machine? If so, it's an expensive one. The suggested retail is $649 for 512K, a built-in drive and a non-detachable keyboard. (*KickStart* is now in ROM, so the system is supposed to start faster.) Add the cost of a $495 monitor and your expenses exceed $1,000.

Frank Leonardi, senior vice president of Amiga sales, however, says that the Amiga 500 should not be considered as just a game machine. Leonardi says, "The 500 is the ultimate home computer, to be used for education, entertainment, and any work that people want to do at home. It can also be used with video products."

C 64 Graphics. "Are you eating celery in there?" the love-of-my-life asked from the next room while I was playing an Apple version of Electronic Arts' *PHM Pegasus*, a military hydrofoil simulator. That's what a 76mm autocannon sounds like on the Apple—so I booted the C 64 version and blasted the roof off my house. I had forgotten how superior the C 64 graphics, animation, and sound effects are to anything but an Amiga or ST.

Some of the most successful home software has been "make-it-yourself" programs like *The Print Shop* and *Paper Models*. Now, an intriguing software/hardware combination called Robotics Workshop (Access; [800] 824-2549; $150) tells you how to build robots with the included electronic and mechanical components and provides type-in programs for controlling them.

For ideas on related projects, *Practical Interfacing Projects with the Commodore Computers* (Tab Books Inc.; [717] 794-2191; $16.95) provides hardware and software information on using a VIC 20, C 64 or C 128 to do such things as run appliances or control science projects.

Epyx Fast Load. A reader inquired about reactivating the Epyx Fast Load cartridge "after using SYS 64738 to reset my 64." The solution is SYS 57194, which turns Fast Load back on without disturbing anything in BASIC.

SHAY ADDAMS, *editor and publisher of* Questbusters, *an adventure-game newsletter, can be reached on CompuServe* (ID: 72267,601) *or on QuantumLink* (ID: JBCHALMER).

IBM

BY HENRY BEECHHOLD

With the new IBM Personal System/2 line of four computers, the PC/XT/AT line is replaced, the replicators are held at bay, and the Mac's rising fortunes may be scotched. The System/2 family offers good to spectacular performance, reasonable pricing, and sophisticated connectivity (micro to micro and micro to mainframe). At the low end ($1,700–$2,300), System/2's Model 30 is a competent 8086 machine. (*See review in this issue.*) At the high end ($7,000–$11,000), the 20MHz 80836 Model 80 outperforms the minicomputers of a few years back. In all models, the graphics are great, and the 3.5-inch disk drive is standard.

Except for the Model 30—the successor to the PC/XT and its clones—the System/2 computers are clearly aimed at the business market. The result of this strategy is a somewhat better than lukewarm computer for the "little guys," and hot to sizzling stuff for the rest. For example, the Model 30's 3.5-inch disks can be formatted to hold 720K—but the other machines can format disks for 1.44MB. Likewise, the Model 30 can run only PC DOS (currently version 3.3), while the other models will use both PC DOS and the upcoming Operating System/2. The latter, not expected until 1988, promises multitasking and much more.

For the new line, IBM has designed a set of proprietary chips that will do all the important work. Indeed, a much larger percentage of these machines actually uses IBM technology and is manufactured by IBM. This will make things a little more difficult for the clone makers, though no one expects that to stop them. And you can be sure the Personal System/2 computers will be cloned—because it appears that IBM will establish a new microcomputer standard just as strong as the current PC standard.

Laser Cartridges. You can save about 50 percent on laser-cartridge replacement cost by using the ACCESS recharging service (ACCESS Recharging Systems, 4533 East Platte Ave., Colorado Springs, CO 80915; [800] 426-2466, ext. 210356). For $69 (plus your old cartridge), you get a recharged replacement that can be blacker than the original and gives you up to twice the number of copies. You only pay for one-way shipping. I'll never go back to buying brand-new replacements for my HP LaserJet!

HENRY BEECHHOLD *is author of* The Brady Guide To Microcomputer Troubleshooting & Maintenance *(Brady Books, Prentice Hall Press).*

MS-DOS

BY STEVE MORGENSTERN

The popular Leading Edge Model D ([800] USA-LEAD) has been improved with a choice of clock speeds (4.77 MHz and 7.16 MHz). With two floppy drives, 512K RAM, built-in parallel and serial ports, monochrome and color graphics adapters, four open slots and a monochrome monitor, the Model D now lists for $1,095. And a new model called the Leading Edge Infinite Memory System comes with one floppy disk drive and one Infinite Memory drive that features two Bernoulli-style removable cartridges. The cartridges can be inserted and removed just like a floppy disk—only they hold 20MB of data each! This new model sells for $1,995.

Meanwhile, for those of us with older Model Ds, a company called Microspeed Inc., in Fremont, CA ([415] 490-1403), has announced Fast 88, a circuit board that switches the clock speed between 4.77 MHz and 7.37 MHz. The upgrade, which does not use any internal slots, must be put in by a certified factory installation center and includes a 12-month extended warranty on the Model D motherboard (there's a 15-month warranty on all Leading Edge products). With installation and an external speed switch, the price is $219.

You Can Take It With You. For those who compute on the go, portables from Toshiba and Zenith might cre-

ate excitement for you. The manufacturers can't seem to build the portables fast enough—and while their manufacturing departments struggle to keep up with demand, R & D keeps adding improved features.

Toshiba offers the T1100 Plus PC-compatible and the T3100 AT-compatible. Except for its LCD display, the T1100 received rave reviews. No sooner said than improved: The new version sports the latest in relatively inexpensive LCD technology—a supertwist screen—for improved contrast. With 640K RAM, two 3.5-inch drives, and built-in parallel and serial ports, the T1100 Plus lists for $2,099.

Meanwhile, Zenith Data Systems ([312] 699-4800) has an upgrade in the works for its very successful Z-181 portable. The new model (dubbed the Z-183) will reportedly offer 640K RAM and increased clock speed (to 8 MHz). A 10MB hard-disk model (an unusual option in a battery-operated portable) is planned.

Clone War Victims. Buying mail-order PC clones can be a money-saving strategy, but let the buyer beware, as they say. *InfoWorld*, a weekly computer industry publication, reports two clone-marketing companies are in deep trouble. Conroy-LaPointe Inc., which filed for bankruptcy in July 1986, has now sold off its assets. Meanwhile, Kamerman Labs has filed for bankruptcy and, in a very disturbing move, invalidated warranties on products bought before the filing. According to *InfoWorld*, customers are now being charged $40 an hour for the repair of products that they thought would still be under warranty.

STEVE MORGENSTERN *can be reached on CompuServe* (ID: 72545,606).

TANDY

BY STEPHEN MILLER

Public demand has convinced Tandy that the Trackstar 128 Emulation board should be made available to everyone. Trackstar, developed by Diamond Computer Systems ([408] 736-2000), allows your old Tandy 1000 or the newer 1000 SX to run most programs written for the Apple IIe/IIc computers, as well as MS-DOS programs. (The board will not fit in the EX.) Trackstar 128 has been marketed only to schools, but is now available through your local Radio Shack store, as well as from Compatible Peripherals ([305] 962-8846).

If you have a substantial investment in Apple software but want to move over to the MS-DOS world, this seems to be a relatively painless compromise. The board sells for $399.95, plus $25 for installation. Part of the installation involves complete removal of the disk drives to allow for the attachment of an external Apple drive.

Keyboard Complaints. Having been subjected to learning the key placement on the original IBM PC keyboard, I found the Tandy 1000 keyboard took time getting used to. For those who either haven't adjusted or who really like the IBM layout, Tandy now offers its version of the IBM enhanced keyboard. (It's the same one that comes with the Tandy 3000 HD.) The keyboard costs $119.95, and the adapter, which should be available this month, will cost $99.95.

Driving the EX. Now that IBM has introduced its Personal System/2 with 3.5-inch disk drives, more and more software will become available in 3.5-inch format. Tandy must have foreseen this, because it markets a 3.5-inch drive that plugs right into the 1000 EX. The 3.5-inch disks store 720K (twice what the 5.25-inch disks store) and are smaller and sturdier.

The 3.5-inch drive plugs into the back of the EX just like the 5.25-inch drive does. I formatted the disk using the same format command that came with my EX DOS disk. Since I want the 3.5-inch drive to be my start-up drive and hold all the system files, I formatted the disk using the FORMAT/S command. To make the system boot from the 3.5-inch disk, press the F3 key as you turn on the computer, until you hear a beep.

Taking advantage of the large storage space, I then loaded my word processor, communications program, and several utilities all onto that one disk. While it doesn't have nearly the capacity of a hard-disk drive, the 3.5-inch drive does give you more storage capacity and cuts down on disk swapping.

STEVE MILLER *is a computer consultant and journalist.*

ORPHANS

BY PATRICK SPERA

I remember when I received my first Sinclair ZX81. It had a terrible overheating problem. I fixed it by placing the circuit board in my freezer and running the video, tape, and keyboard cables to the top of the icebox. The setup worked, but I tired quickly of standing on a chair to type in programs!

Now, since most of my machines lack a fan for draw-through cooling, I currently use a six-inch desk fan that blows cooler air across the computer. I also don't power them up in the heat of the day if I can avoid it—because out here in Oklahoma, it gets *hot!*

Columbia Lives! Columbia, makers of the Columbia PC, an IBM-compatible sold in the early 1980s, was one of the many computer companies that folded. But this story has a happy ending—by not ending at all.

The owner of Godfather's Computer Syndicate ([305] 774-1111) bought the rights to the Columbia PC, 1600, Portable, and ATC-6000. He currently supports these machines with parts and service.

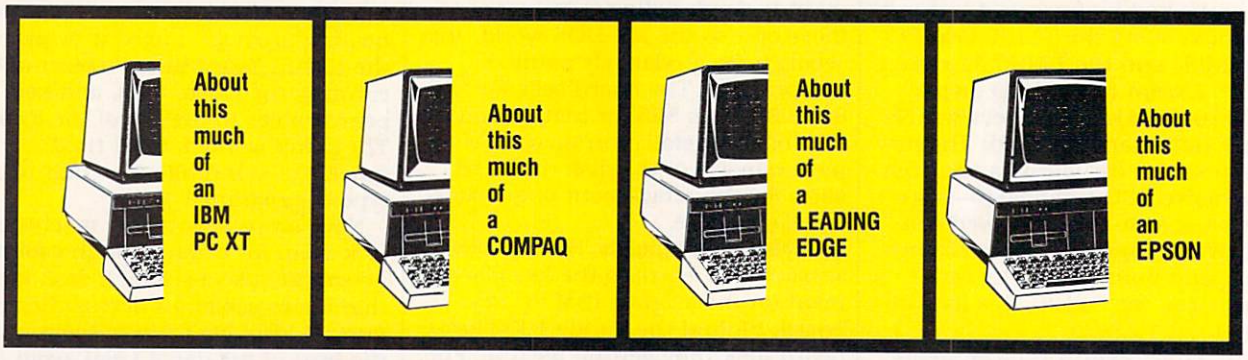
In addition, owner Alan Welsh organized a national Columbia Owners Group (P.O. Box 2584, Altamonte Spring, FL 32714; [305] 774-1111). If you hurry, you can join for a $25 charter membership fee.

ADAM Software. Reedy Software (10085 60th Street, S.E., Alto, MI 49302) has released *Solo Adventures #3* (DDP, $10.95; disk, $8.95), a companion for its graphic adventure *MageQuest* (DDP, $15.95; disk $13.95). In this new series of adventures, you once again attempt to thwart the vile plans of Enteon, Lord of Dire. Face monsters and magic as you seek to recover the Vicars of Wer.

Cheese tasters in the audience might want to try Reedy's *Lab Mouse* (DDP, $12.95; disk, $10.95). This game gives you a mouse's eye view of a maze. Find out just how hard those lab mice work for their supper! And if you want a copy of Reedy's current catalog, just send the publisher a self-addressed, stamped envelope.

PATRICK SPERA *can be reached on CompuServe* (ID: 76703,4350).

How much computer will $799 buy?



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Microsoft MSDOS V3.2 operating system, Digital Research DOS PLUS operating system, Digital Research "GEM Desktop," "GEM Paint," "GEM Doodle," Locomotive Software "Basic 2" and very detailed, clearly presented user manual.

Optional Features

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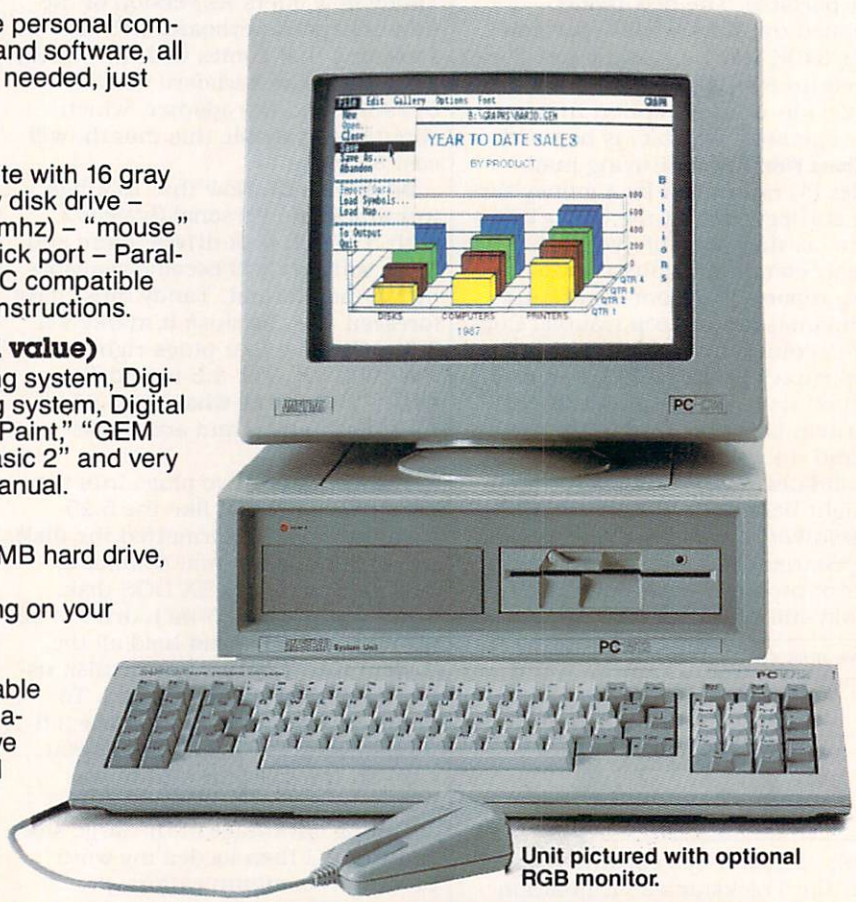

Unit pictured with optional RGB monitor.

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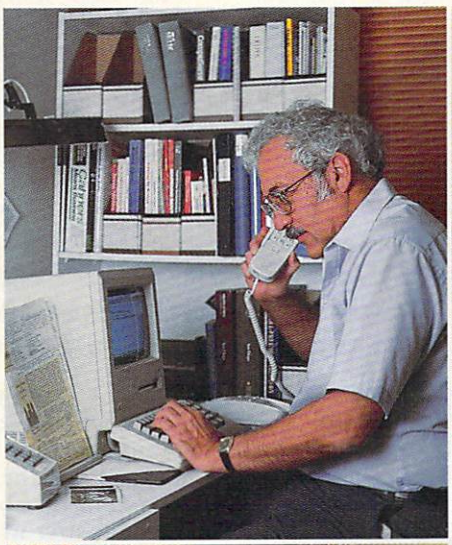
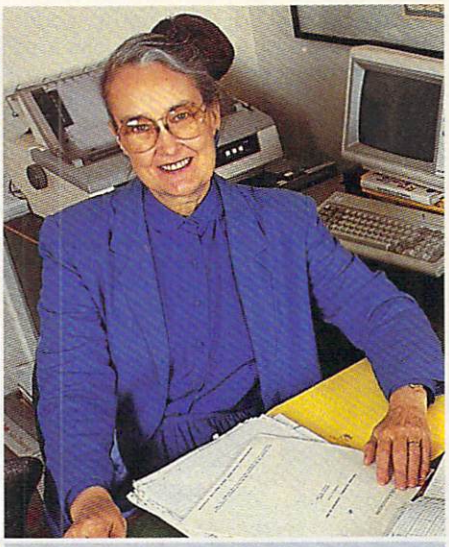

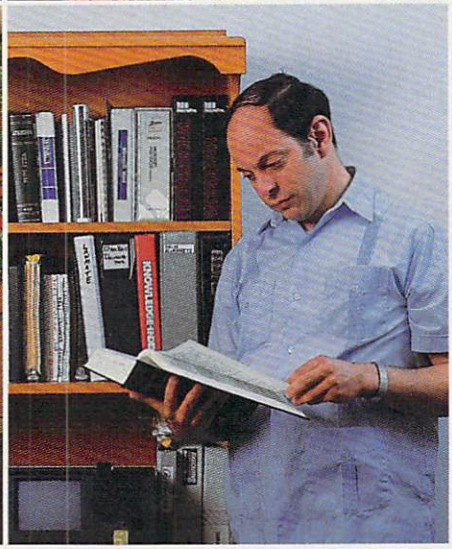

FOUR VETERAN HOME-BUSINESS OPERATORS TELL THEIR STORIES

BY BARBARA STEIN

Home is where we hang our hats. And nowadays, it's where we plop our briefcases, too. According to the Bureau of Labor Statistics's May 1985 Current Population Survey, more than 3.6 million people are now self-employed and do some or all of their work at home. Another 5.4 million work at home as employees of large corporations. Preliminary projections from the 1987 National Work-At-Home Survey, done by Electronic Services Unlimited, indicate that nearly 20 million Americans may spend at least part of their time working at home. And these homeworkers are twice as likely as the general population to own and use a computer.

The electronic revolution has had a dramatic impact on society. In a decade, the personal computer has changed the way many people think, communicate, and perform routine tasks—both at home and in the office. The computer and computerized tools such as personal copiers and facsimile machines have challenged

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an organizational structure born of the Industrial Age and created opportunities never before imaginable.

For those longing to escape the corporate setting to work at home—whether to raise children, avoid long commutes, or just "go it alone," the options appear limitless. But as far as running a business goes, only a small percentage of home-based entrepreneurs make it beyond stage one and actually become independent and successful. Why?

As the four seasoned professionals profiled here explain, attaining success takes more than just a burning desire and a few opportunities. In fact, as each points out, it takes a high degree of self-motivation and discipline, a willingness to work long hours, a mind-set that is consistently goal-oriented—and a sprinkling of good luck. Beyond that, you've got to continually sell yourself or your product; many good ideas or products wither for lack of successful marketing. (*See sidebar entitled "Marketing," on page 30.*)

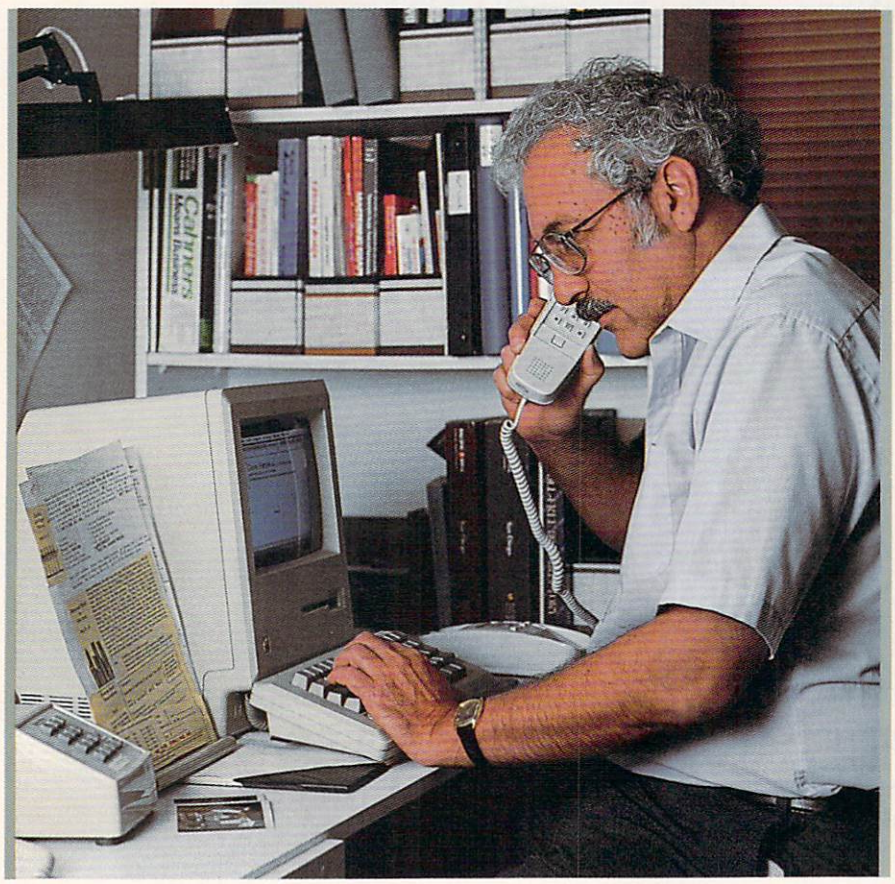
What are the rewards? Joanne Pratt, a business consultant who has worked at home for nearly 30 years, sums it up well. "I enjoy the independence of homework and enjoy choosing what I want to work on. I like not having to put up with the nonproductive constraints of working in groups and sitting through meetings. There's so much dead time in the corporate world."

Adds Bob Walcher, who runs a desktop publishing firm in San Diego: "I can't ever see myself working for anybody again. I can sit down with a project and work for 20 hours and get up and still be excited. I'm self-motivated and not motivated by money. My kick is doing the job and seeing it turn out well."

BOB WALCHER

OWNER, DESKTOP PRODUCTIONS

"I just wanted to get away." At age 49, Walcher sold his franchise and went to work full-time—at home.



Most people would describe San Diegan Bob Walcher as an entrepreneur. He's put himself—and his capital—on the line for several ventures. He's been a television and film producer, co-owner of a jazz record company, and owner of Great Expectations, a video-dating franchise. Today he owns Desktop Productions, a newsletter-publishing business he operates from home.

Walcher's itch to find a new challenge surfaced two years ago. "All I could think of was 'let me out of here,'" he recalls, referring to the corporate office. "Between my employees and thousands of clients, I just wanted to get away." So, at age 49—with his kids grown and his wife operating her own business downtown—Walcher sold the franchise and went to work full-time—at home.

"I was already using the Apple IIe and a dot-matrix printer to produce newsletters for my business when *PageMaker* came out for the Macintosh. It seemed like a natural. With my background, print was the only medium I hadn't explored," says Walcher, who has degrees in film and communications. "Of course, I was lucky to have the luxury to do so. After selling my business I had income no matter what happened. So I took the chance."

Armed with a Macintosh, LaserWriter Plus, *MacWrite*, *MacDraw*, *PageMaker*, and a subscription to a clip-art service that offers digitized photos on disk, Walcher began producing newsletters for local companies, organizations, and associations.

"So many newsletters are typewritten and look bad," says Walcher. "The overall quality needed updating, and it seemed like a good business to operate from home. I felt like there was a big market there, and there is!"

Initially, Walcher did no marketing of his services. Nonetheless, business grew as friends and associates sought his services and happily referred others. At the same time, he explored related markets. Reflecting on his own experiences as a businessperson, Walcher recognized that not all printed matter warranted professional typesetting. "I was always sending things out (for typesetting) and 90 percent doesn't need to be that slick. So I offered a low-cost alternative, quicker corrections, and instant copies."

As the word spread, Walcher took on restaurant menus, tabletop tents (those fancy cards placed in plastic holders), and advertising fliers. He did the pasteup as well as the printing. "Problem was," he confides, "I felt like a typing service. Sometimes I ended up getting 14 pieces of paper with crossed-out errors. I devoted a lot of time to preparing materials and wasn't making much per hour. I was

dealing with the low end of the market."

Seeking higher income and a more upscale market, Walcher headed in a new direction seven months ago. For special markets, he's developing several "syndicated" newsletters that his clients will be able to slightly customize for themselves. "You know, the kind of thing your dentist sends out," says Walcher. Also, for subscribers only, he's preparing a newsletter—a four-page monthly he'll sell for $160 to $200 a year. To produce the newsletter (the contents of which he doesn't want to reveal just yet), Walcher plans to hire freelance help.

"I've done a lot of reading and research for this, and my best information came from the Newsletter Association ([703] 527-2333). The main thrust to get started, of course, is direct mail—an art in itself. I've been involved with that for over 10 years now, so I know what it takes."

When we last saw him, Walcher was wading in national data bases and preparing to launch his newsletters. Will his latest venture be a success? "We'll see, won't we?" he chuckled.

LINDA RAGLE

REGIONAL MANAGER

"I approached the president with a proposal, showing him how I could cut overhead by working from home."

"I feel I have the perfect job!" says Linda Ragle, who lives in Orange County, California and works from home for Oriflame International. "Having a home-based business is an extension of who I am. I like being surrounded by my things. It gives me professional strength. Of course, it's not for everyone. You have to know how to turn off the home and turn on the business."

Ragle has been turning on the business from home for 18 years. "I started in 1969, working a few hours a week for Jafra Cosmetics, making product presentations in my home. My children were preschoolers then and my number-one priority. But as they grew older and needed me less, I took on more responsibility and expanded my career."

That expansion led to a position with Jafra's top management. By the time she left the company, she was generating two million dollars a year in sales "from the kitchen table in a corner of the family room."

Ragle joined Oriflame International—a direct-sales European skin-care line—in 1982, when the company expanded in the United States. As Western Regional Director, she took charge of training and development of beauty advisors in 10 states and worked closely with the president on the company's image and philosophy. Travel and a brand-new regional office came with the position. For the first time in her career, Ragle worked outside her home. But the corporate setting wasn't for her.

"It sounded so glamorous, working from a prestigious office," Ragle recalls. "But I didn't like it. Finally, I approached the president with a proposal, showing him how I could cut overhead by working from home and convincing him that it wouldn't hurt the company's image. He was very receptive."

Returning home, Ragle set up two offices. "I have an old English desk by the fireplace in my living room where I meet with small groups. The other office is an L-shaped bedroom for my office equipment and secretary."

Moving home didn't hurt her performance. She doubled sales in the first six months and, in the next six, turned a healthy profit for the region. She became even more productive when she computerized in 1986. Today she uses a Samsung computer, a Citizen MSP 20 letter-quality printer, and *Symphony* software to handle a variety of tasks. *Fontasy* software adds fancy lettering and a special look to her monthly newsletter that is sent to beauty advisors.

"To think I used to have to go through a Rolodex to target areas and identify mailings," she laughs. "The computer changed all that. Now I use my data base, identify large areas, and divide them into specific districts. When I'm traveling, I simply pull out names of reps and clients and print mailers announcing upcoming meetings. It saves me hours and many steps.

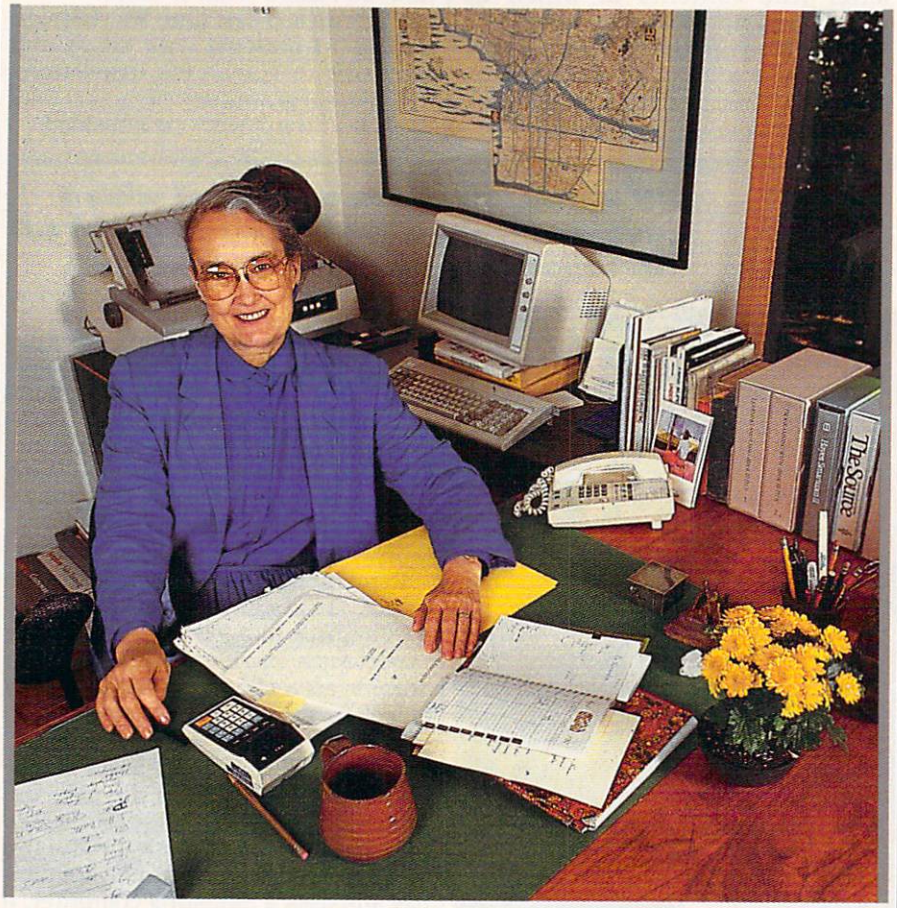
"Before I computerized, I was sending up to 100 handwritten postcards a month, recognizing people for their achievements. So I designed special forms for specific accomplishments and printed them on letterhead. I also send monthly birthday cards that contain brief handwritten notes."

Ragle's enthusiasm for her work is infectious. "I'm a home-business person at heart—I feel so honored being able to offer a home-business career to others."

JOANNE PRATT

BUSINESS CONSULTANT

"My home office is very pleasant. I have my own garden, and I'm not closed up in a corporate office."



When the Bureau of Labor Statistics considered adding "homework" questions to the Population Survey, they took Joanne Pratt's advice and added two more questions to the 1985 supplement.

Last October, Pratt organized a symposium, held in Washington, D.C., as part of her work for the Small Business Administration. The SBA wanted to find out how broad an interest there is in home-based work on the part of other federal agencies.

Why is this woman so influential?

Pratt, of Dallas, Texas, is a home-business expert whose reputation in national circles is growing. A pioneer in the field, Pratt has worked at home for nearly 30 years. Wife and mother of three, she juggled home and family while establishing her consulting business. At the same time, she became fascinated by the home-based work force and began conducting studies and publishing her findings.

Pratt recalls her beginnings: "I was working as a research scientist at the time of the oil bust in 1959. (Pratt has a graduate degree in chemistry from Harvard.) The company changed my position from a full-time to a part-time consulting status. It wasn't my idea, but it presented an opportunity that I took.

"I started out as a consultant to corporate clients, medical labs, and various companies on chemical topics. For three years I was a consultant to individuals and small businesses trying to decide what computer equipment to buy and how to automate. Simultaneously, I began to research the home-based work force."

Xerox Corporation funded Pratt's first study. "From that point on," she adds, "I've been working mainly on government contracts and doing a little bit of private consulting work."

Pratt's research, proposals, and mailing lists are all produced and stored on computer. She has an IBM PC with a hard-disk drive and uses *SuperCalc*, *dBase*, and *WordStar* software. Pratt also uses a modem for electronic research.

How does she like working at home? "My home office is a very pleasant environment. I have my own garden, and I'm not closed up in a corporate office with no windows. I get a lot of energy out of the consulting relationship—the push back and forth trying to arrive at conclusions. I'm glad I lost my job in 1959."

MARKETING: OFTEN OVERLOOKED, BUT ALL-IMPORTANT

Competition in business is stiff. Good ideas are plentiful, but few become overnight money-makers. As Thomas Mann, the philosophical German novelist, pointed out: "It is impossible for ideas to compete in the marketplace if no forum for their presentation is provided or available."

Creating that forum and presenting it with flair is what marketing is all about. Unlike corporate employees, who may specialize in one of many fields, but leave the marketing to others, home-based professionals do their own marketing. To succeed, they must be effective marketers.

Home professionals utilize the same strategies used by all business owners: networking, direct mail, a professional attitude and appearance, and persistence in keeping in touch with existing and potential customers.

Here's what four successful home-based businesspeople have to say about their marketing techniques. Obviously, different people and different businesses take different approaches, as the conflicting ideas about direct mail indicate.

Bob Walcher: "Direct mail is the only way to sell a newsletter. It's a given. I joined the Newsletter Association, and about 40 percent of their information is devoted to direct-mail marketing. I also have quite a few books on the subject. It's not something that you just sit down and do. Research is important. There are specific formulas that will help you understand what works.

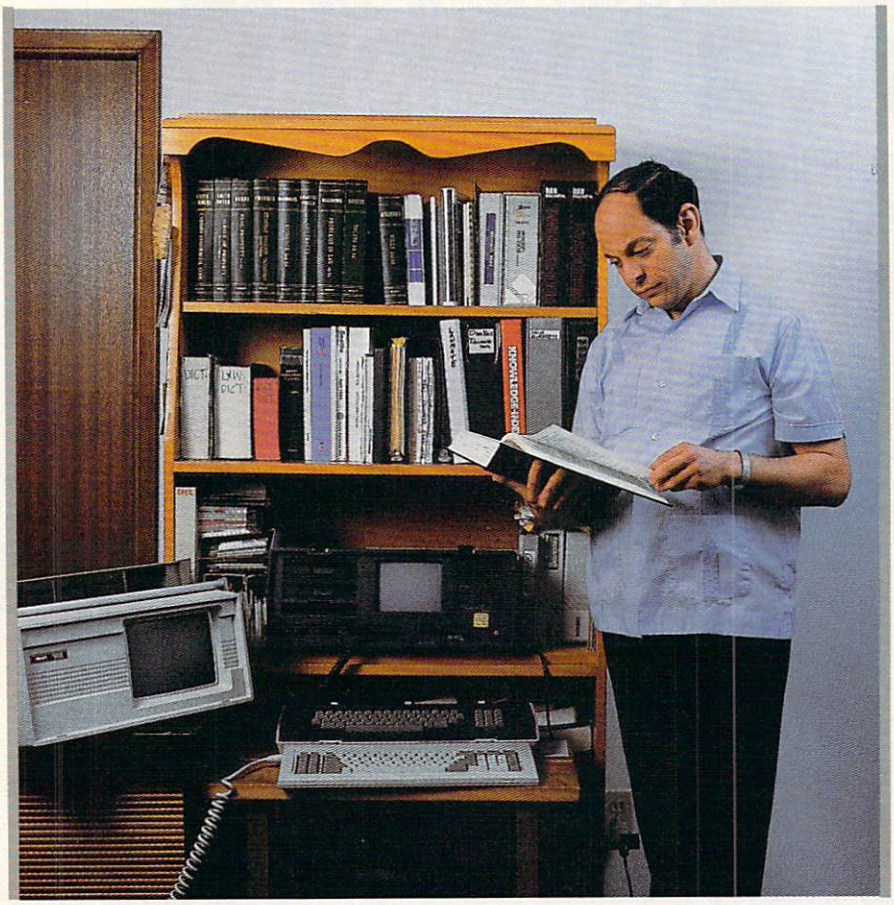
"The best thing about direct mail is that it's something that you can track. You know *exactly* why the person is responding. You can also test variables and change your approach. When you change, you can see a change in the business."

Joanne Pratt: "The most succesful way for me to sell my services is through networking. I attend a lot of meetings and conferences. The trick is deciding which

RICHARD SCHENKAR

ATTORNEY-AT-LAW

"I'll go on-line Friday night if someone needs an answer on Saturday or Monday."



"My aim is to put people in contact with the information they need to be effective," says Richard Schenkar, a self-employed lawyer whose practice has two components. "As a lawyer, I put people in contact with other people to help them make effective choices about their courses of action. When I'm helping other lawyers, I put them in contact with information they need to be more effective."

Schenkar's aims may be common among other attorneys, but there's nothing common about him or his law practice.

From his suburban home in the Seattle, Washington area, Schenkar handles a regular client caseload and also performs on-line research for other lawyers. To top it off, he has no clerical help, but processes all his own paperwork.

Assisted by "several Osborne computers," two printers (an Epson RX-80 and a Silver Reed EXP 550), and his software (*WordStar*, *PC File*, and *SuperCalc*), Schenkar produces volumes of legal briefs, reports, correspondence, an occasional graph, and billing. To help market his on-line research service to other lawyers, Schenkar even produces his own newsletter. He has also designed and printed a brochure using *Fancy Font*, a graphics lettering program. His logo is a desktop computer with an open book on the screen.

"I was doing research for other people before I started my practice," says Schenkar, who also has an MBA degree. "I subscribe to DIALOG and trained on the National Library of Medicine's own system. I've taken both beginning and advanced training courses."

Schenkar makes himself readily available to clients and is no stranger to working odd hours. "I'll go on-line Friday night if someone needs an answer on Saturday or Monday. An average billing that includes on-line time plus retrievals is $200–$400."

How do clients react to an attorney working from home? "I prefer to meet them on their own turf because I find I get more out of it that way," says Schenkar. If he needs to meet clients on his turf, he rents an executive suite downtown. "I don't camp there because I have other things to do. But I can use a fully furnished office and conference rooms if I need to. Renting keeps costs down and means I pay for precisely what I use." FC

ones are worth your investment. I strive for those with topics I'm interested in, those with a high-density climate for my services.

"I also reach out to people with the telephone; it's my main tool. People often call me and ask for information. I can turn that into a project by showing them how I can help. My strategy is to match what I want to do with somebody who wants to pay for it. The trick is finding the match!

"If you're starting out, first ask yourself, 'Do I want to operate a business?' Then, 'How do I make this business more profitable?' Set goals and work out your strategies. If you don't ask yourself these questions first, you'll never do it or you'll end up casually selling to neighbors and friends.

"Finally, it's important to establish your own corporate culture, too. I maintain a businesslike image to the outside world and to myself."

Richard Schenkar: "My most successful approach is through personal contact. I generally meet people through activities, professional groups, and other organizations. I don't mass-mail my newsletter because my own practice is to throw out the direct mail I receive. I choose to mail only to people who've expressed an interest in what my communication says. It takes a while for people to contact me—but I'm set up to deliver a long-term relationship."

Linda Ragle: "We're an income-opportunity company and a nice social network for women. So I spend a lot of time with people, whether I'm home or traveling. I send a monthly newsletter that contains a calendar of events and recognizes people individually. The personal touch is very important. Recognition is part of sales-motivation philosophy.

"I also meet with newspaper and radio advertising groups, attend conferences, and speak to professional women's groups."

IBM PERSONAL SYSTEM/2 MODEL 30

SOMETHING OLD, SOMETHING NEW, SOMETHING BORROWED, SOMETHING BLUE

BY HENRY BEECHHOLD

Reviewer Beechhold using the Model 30 in his home office.

The IBM Personal System/2 Model 30, shown here with one 3.5-inch drive and a 20MB hard-disk drive, can display 256 colors simultaneously.

In plain terms, the new Personal System/2 Model 30 is merely the 1987 version of the now discontinued IBM PC XT. It uses the same microprocessor (Intel 8086) that many of the IBM compatibles already use. It runs about twice as fast as the old IBM PC XT, but not necessarily or notably faster than many compatibles already on the market.

On the other hand, the Model 30 offers stunning graphics and 3.5-inch disk drives. More important, it runs most existing IBM software and will run new color graphics software. All of the Model 30 software also runs on the other Personal System/2 models (50, 60, 80), so that you'll have a path for upgrading.

The Model 30, considerably smaller than the old IBM PC, is a stylish system. Unfortunately, the monitor I used lacked the computer's fine lines and looked overweight by comparison. The keyboard, 3.5 inches wider than the computer, is mounted in a panel that is curved to facilitate comfortable typing.

The Model 30 configuration we tested is probably the one most buyers will prefer—one with a 3.5-inch floppy-disk drive and one 20MB hard disk. (You can also buy a version with two 3.5-inch disk drives.) Both models come with 640K; serial, parallel, and mouse ports; a connection for both monochrome and color monitors; and three expansion slots. The slots are designed to accommodate all existing IBM-compatible expansion boards. However, unlike Model 30 software, Model 30 expansion boards will not work on Models 50, 60, or 80.

KEYBOARD

The keyboard—the same one used on the latest XT and AT models and now the "standard" IBM keyboard—is quite heavy, not something you'd want on your lap for long periods of time. But the keyboard is an efficient tool—with 101 keys!

Included are left and right ALT keys, left and right CTRL keys, 12 function keys, a double bank of cursor/editing keys—one in the "traditional" location on the numeric keypad, the other separate.

If you're used to finding, say, the BACKSLASH key (\) on the lower left side of the main keyboard, you'll discover that it has drifted to the upper right. If you want a giant L-shaped ENTER key (as many IBM-compatible computers have), tough luck—you'll have to settle for a smaller, rectangular model.

The keys respond with that clean, positive touch IBM pioneered with its typewriters. Some keyboarders, however, may find the keys too resistant. Once I rewired my fingers (so to speak), to find the new placements of a few secondary keys, I decided that IBM really can make a proper keyboard.

DAZZLING DISPLAY

Without doubt, the color graphics of the Model 30 are the most noticeable improvement over the old PC line. The Model 30 can display 256 colors simultaneously, chosen from a total of 256,000! New software (*see sidebar*) and a mouse should dissolve any Macintosh envy that IBM fans have been suffering. The Model 30's top resolution (640 x 480) is higher than the Mac's 512 x 342.

You can plug four different monitors into the same port on the back of the Model 30—the Monochrome Display Model 8503 ($250); the Color Display 8512 ($595); the Color Dis-

PHOTOGRAPH BY JOHN SIKORA

MODEL 30 FACTS

PRICE: $1,695–$2,295 without monitor
HARDWARE INCLUDED: Two 3.5-inch disk drives, *or* one 3.5-inch and one 20MB hard-disk drive; clock/calendar; 101-key keyboard with numeric keypad
SOFTWARE INCLUDED: Starter diskette
OPERATING SYSTEM: PC DOS 3.3 ($120)
BUILT-IN PORTS: Serial, parallel, mouse, color/monochrome monitor
COLORS: 256 displayed at once from a palette of more than 256,000
RESOLUTION: 640 x 480 (2 colors); 320 x 200 (256 colors); 320 x 200 (4 colors)
WARRANTY: One year

HENRY BEECHHOLD *writes the IBM column in* FAMILY COMPUTING*'s "Machine Specifics."*

play 8513 ($685); and the Color Display Model 8514 ($1,550). Monitors designed for the older IBM PC/XT/AT line, however, will not work with the Model 30.

To make up for this nuisance, the Model 30 monitors can run color software on a monochrome monitor. Colors will be displayed in 64 shades of grey. On the IBM PC/XT/AT line, you need a color monitor to run most color graphics software; this means that businesspeople who use monochrome monitors can't run much educational software or games, let alone display color business graphics.

I tested the Color Display 8513, a 12-inch RGB (red, green, blue) monitor. The monitor's matte surface both suppresses reflections and gives images a kind of depth. The image quality and the color range are most beguiling. However, as always, text display is not as sharp as on a monochrome monitor. The monitor's built-in tilt/swivel base (optional on some other monitors) allows you to adjust the viewing angle to your convenience.

There are two user-adjustable controls—contrast and brightness—neither of which adjusts over a wide range. This short range is a good idea because it prevents the tube from "burning" from running at excessive brightness.

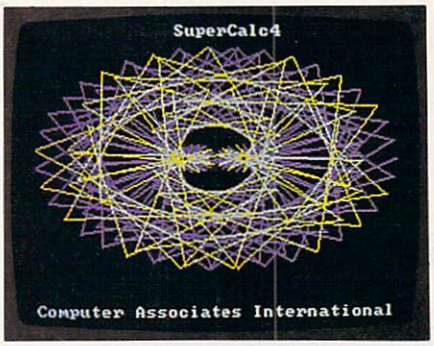
DISK DRIVES

IBM has built the entire Personal System/2 line around 3.5-inch disk drives, originally designed by Sony and first popularized by the Macintosh. Not only can the Model 30's 3.5-incher store 720K (Model 50, 60, and 80 drives can store 1.44MB), or twice as much as the 5.25-inch IBM drives, its protective cartridge makes it seem virtually indestructible. As many as a half-dozen of these neat little disks can be stuffed into a shirt pocket with no damage to either pocket or disks.

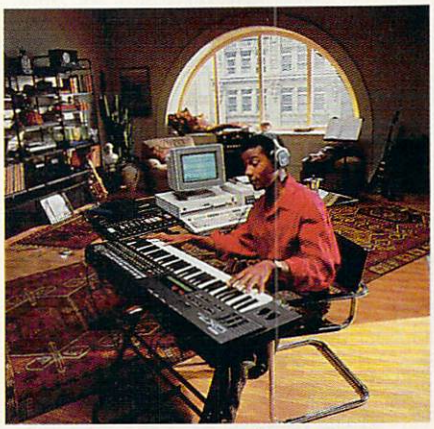
Disk-drive operations on the Model 30 are almost noiseless. The internal fan whispers so reticently that you won't notice it. Gone are the days of coffee grinder-and-wind-tunnel computing!

OPERATION

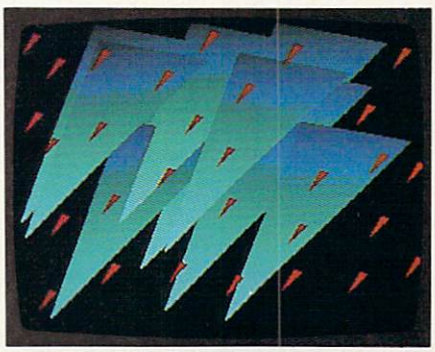
Setup entails nothing more than plugging in the keyboard cable, the monitor signal cable, and the two power cords. First-time computer users will appreciate the *Starter Diskette* that demonstrates the system's various features.



A graphics design produced with the spreadsheet *SuperCalc 4* (Computer Associates)



IBM PC Music Feature (a $495 expansion board) allows you to connect MIDI keyboards and synthesizers to the Model 30.



An example of effects possible with *DR HALO II* (Media Cybernetics)

A photograph scanned into the desktop-publishing program, *HALO DPE* (Media Cybernetics)

With the *Starter Diskette* mounted in the floppy drive, you turn on the two power switches. After the usual (tedious) wait for the internal diagnostic routine to check memory, the system will come to life with a big IBM welcome in vivid color. From that point, you can experiment within the limits of the demonstration.

Experienced users will quickly move on and boot up PC DOS 3.3 ($120). Once you have DOS running, you can take command and run applications software—if you have 3.5-inch disks!

To test the Model 30, I transferred a range of software from 5.25-inch disks to 3.5-inch disks (*see "Model 30 Software"*). All programs ran better than they did on my PC compatible because of the twofold speed increase, confirming that the Model 30 is at heart a buzzed-up PC/XT.

Of course, the ability to run old software at increased speed is no reason to buy a Model 30, because you can do that on any number of IBM compatibles—or an IBM PC with an accelerator board. New software on 3.5-inch disks that takes advantage of the color graphics is the buying incentive.

Intensive testing of the Model 30 failed to produce a single problem. The machine was left running 24 hours a day without a hitch. The computer never rose above room temperature; even the monitor remained remarkably cool. If the test unit is typical—and there's no reason to think otherwise—the Model 30 can't be faulted with respect to reliability.

ODDS AND ENDS

All connectors and interfaces are mounted on the back panel. I'd prefer the keyboard cable to be connected on the front, as it is on the Epson Equity computers. This way, the cable has greater reach and is far less susceptible to damage at the connector (no corners to turn, no stressful tugging).

The red power switch (marked, computerishly, 1 and 0 for on and off) is conveniently located at the right side of the front panel. The only drawback to the placement is that it's within reach of little hands—a warning for those working around children. On the other hand, you can "lock" the keyboard—so that others can't use it—by turning a key on the side of the machine.

Opening the computer for board

SCREEN SHOTS BY KAREN KANE

installation requires the loosening of four "captive" screws (they remain attached to the machine and can't be lost), two on either side of the enclosure in order to slide back the lid and lift it off. The card cage with its three horizontal expansion slots takes up the left-most third of the space.

PERIPHERALS

IBM introduced several new peripherals with the Personal System/2 line. The IBM mouse is similar in look, feel, and function to the old reliable Microsoft two-button mouse, so current users will feel right at home. Users of *Microsoft Word*, *PageMaker*, *Fontasy*, any of the *GEM* programs, or one of several business graphics programs will probably want to buy a mouse. Later this year, IBM says it will sell a desktop-publishing package that includes the mouse and its new Personal Pageprinter, plus various software.

The IBM Music Feature is an expansion board that also works with the PC/XT/AT line and allows you to produce eight sounds at once. However, the built-in speaker can't do justice to the fine music this board can produce, so you really need an external speaker or a synthesizer. The Music Feature gives you a MIDI interface, the current standard for connecting music synthesizers to one another and to computers.

If the mouse and color graphics are meant to make Macintosh fans pause, the IBM Music Feature clearly means to muscle in on Apple IIGS, Atari ST, and Commodore Amiga territory, and to lend conviction to IBM's desire to make Model 30 a computer for all purposes and all people.

TO BUY OR NOT TO BUY?

A Model 30 with two floppy drives and a monochrome monitor lists for $1,945 (without PC DOS). A Model 30 with a 20MB hard disk and a color monitor lists for $2,890 (without PC DOS). Does this computer have enough going for it to warrant a premium of at least $500 over the cost of the enhanced PC, XT, or even AT clones? A good question.

If you long to take advantage of the new software specifically designed to run on the Model 30, then the premium may be worth it. If you can fulfill your needs with the current range of software, then the new machine's features will be mere bells and whistles—though they will provide you with an upward growth path.

Although the machine doesn't drive me to new heights of ecstasy, I like it. If I were in the market for my first serious desktop computer (instead of my nth!), and I couldn't afford the System/2 heavyweights, I'd put the Model 30 on my "short list" of choices.

But if you've got a souped up PC/XT—with an accelerator module, EGA graphics board, 640K of main memory—then the Model 30 just isn't going to sing to you, even if you're taken with its sleek, "upscale" look. If you're replacing a PC (or clone) with a genuine IBM—and could afford to do so—you'd probably pass the Model 30 for a Model 50, a "super AT." FC

MODEL 30 SOFTWARE

MIGRATION: FROM 5.25 TO 3.5-INCH DISKS

If you have a library of 5.25-inch software, how will you transfer it into 3.5-inch format? You have several choices, as outlined below. But first you should be aware of several reported technical problems.

Timing-dependent software can be transferred, but won't operate properly at the Model 30's higher speed. One user says that IBM's Data Migration Facility (*see below*) didn't work properly with the Tandy 1000. Others report minor problems transferring between different versions of MS-DOS.

Finally, copy-protected software (including most games and Lotus *1-2-3*) cannot be transferred unless a copying program is used. *The New York Times* recommends a copy program called *Copy II PC* (Central Point Software; [503] 244-5782; $39.95) that will be available in both software formats.

With these problems in mind, consider the options:

1. Data Migration Facility. This IBM product ($33) is a little black "widgit" that plugs into the parallel port of the Model 30. With two pieces of software (*RECV35* is on the *Starter Diskette*, and *COPY35* comes with the DMF), the Data Migration Facility allows you to transfer software from a PC, XT or AT computer to the Model 30 through a standard IBM printer cable.

2. External Disk Drives. IBM sells an external 5.25-inch disk drive ($335 plus a $60 adapter) that can be connected to the Model 30. Programs from that drive can be "read" into the Model 30 and saved on a 3.5-inch disk.

Conversely, IBM sells an external 3.5-inch drive ($395) that can be connected to the IBM PC/XT/AT line. You can load 5.25-inch software into the computer and save it on the 3.5-inch disk.

3. Modem Transfer. With a modem, you can upload software from a 5.25-inch drive to a host network (such as CompuServe or The Source) and then download it to a 3.5-inch drive. You can transmit it directly by phone, from one computer to another.

Using communications software in two computers (but no modem), you can send software from serial port to serial port. The serial ports need to be connected with a null modem cable.

3.5-INCH SOFTWARE

To run software on the Model 30, it must be on a 3.5-inch disk. (The exception, of course, is software you have downloaded directly to a hard-disk drive.) Short of actually transferring the software yourself from a 5.25-inch disk to 3.5-inch disk (*see "Software Migration"*), here's a look at software you can expect to find in 3.5-inch format:

1. Old Titles in New Format. A number of software publishers are converting their programs from 5.25-inch to 3.5-inch format. While publishers still sell 5.25-inch versions, at least one (Ashton-Tate) is selling a package with both formats.

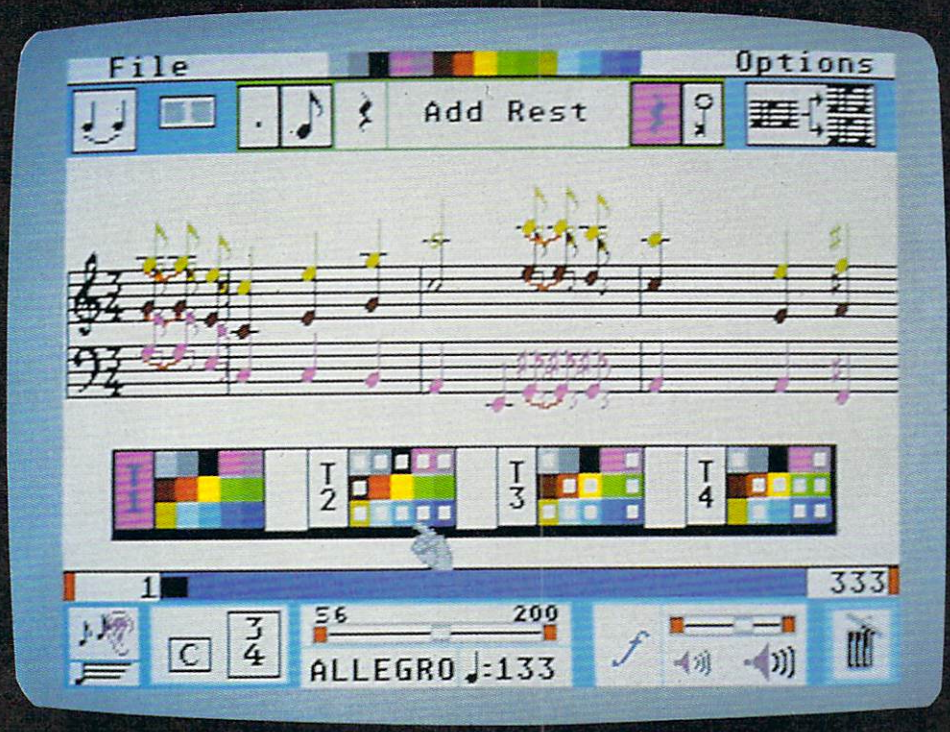
IBM itself has put out more than 150 titles in 3.5-inch format, including a wide range of educational software. A number of third-party publishers—including Ashton-Tate, Borland, Digital Research, Lattice, Lifetree Software, Living Videotext, Lotus, MECA, MicroPro, Microsoft, Software Publishing Corp., and WordPerfect Corp.—have followed suit.

2. Old Titles Upgraded in New Format. To take advantage of the Model 30's increased speed, increased disk storage, and improved color graphics, many publishers are upgrading existing products *and* converting them to 3.5-inch format. For instance, IBM's *Graphics Development Toolkit* and *Storyboard Plus* support 256 colors.

Other titles that are or will be available in new versions include *dBase III Plus*, *Framework II*, and *MultiMate Advantage* (Ashton-Tate); *Reflex* and *Turbo Pascal* (Borland); *SuperCalc 4* (Computer Associates International); *GEM Graph*, *GEM Word Chart*, and *GEM Write* (Digital Research); *1-2-3* and *Symphony* (Lotus); *DR. HALO II* (Media Cybernetics); *Microsoft MultiPlan* and *Microsoft Word* (Microsoft); *Harvard Total Project Manager II*, *pfs:Professional Write*, *pfs:Professional File Report* and *pfs:Professional Plan* (Software Publishing Corp.); and *PC Paintbrush+* (Z-Soft Corp.).

Making Music

BY JOEY LATIMER



***The Music Studio*, published by Activision, is shown here on the Atari ST.**

IF YOU ENJOY MUSIC (AND WHO DOESN'T?), BUT DON'T KNOW A CHORD FROM A SCALE OR AN A-FLAT FROM A C-SHARP, THEN READ ON

Musical training is a more potent instrument than any other, because rhythm and harmony find their way into the inward places of the soul. —PLATO

You can't read music? Your fingers can't keep up with the tempo of "Chopsticks"? You flunked out of band in the sixth grade? Big deal! With just your computer and a music program, you can compose original songs, jam with an invisible band or orchestra, and learn all about music. It's hard to believe that without even an instrument or musical training, you can compose rock, jazz, or even classical music.

Many music novices incorrectly assume that combining computers and music is a complex process, appropriate only for recording engineers, professional musicians, or, at the very least, serious amateurs. In reality, when it comes to making tunes with computers, there's only one prerequisite: enjoying music.

As both a musicmonger and one of FAMILY COMPUTING's technical editors, I'll explain how easy it is to use your computer for making music and where to find the products you need. I'll also talk about some of the most innovative music products on the market and how different computers rate for creating music.

Technical editor JOEY LATIMER, *a musician and recording engineer, writes most of the music programs that appear in* FAMILY COMPUTING.

HOW ARE MUSIC AND SOUND PRODUCED?

Personal computers usually play music and make sounds in one of two ways. Programs for machines like the Apple II Plus/IIe/IIc and IBM PC and Personal System/2 Model 30 send a series of "clicks" to the computer's speaker or to a television's speaker. Clicking the speaker faster generates a higher-pitched sound and clicking slower lowers the pitch.

With the second and superior-sounding way, computers generate sounds by use of a special integrated circuit or sound chip (like the C 64 SID chip). Software written for machines with sound chips can play harmonies and imitate various instruments' sounds. These computers include Amiga, Apple IIGS, all Atari 8-bits, Atari 520ST/1040ST, C 64/128, IBM PC*jr*, Macintosh, and Tandy 1000.

WHAT PART DOES SOFTWARE PLAY?

With some software you can use a joystick, mouse, or the computer's keyboard to place notes on a musical staff. Some software even allows you

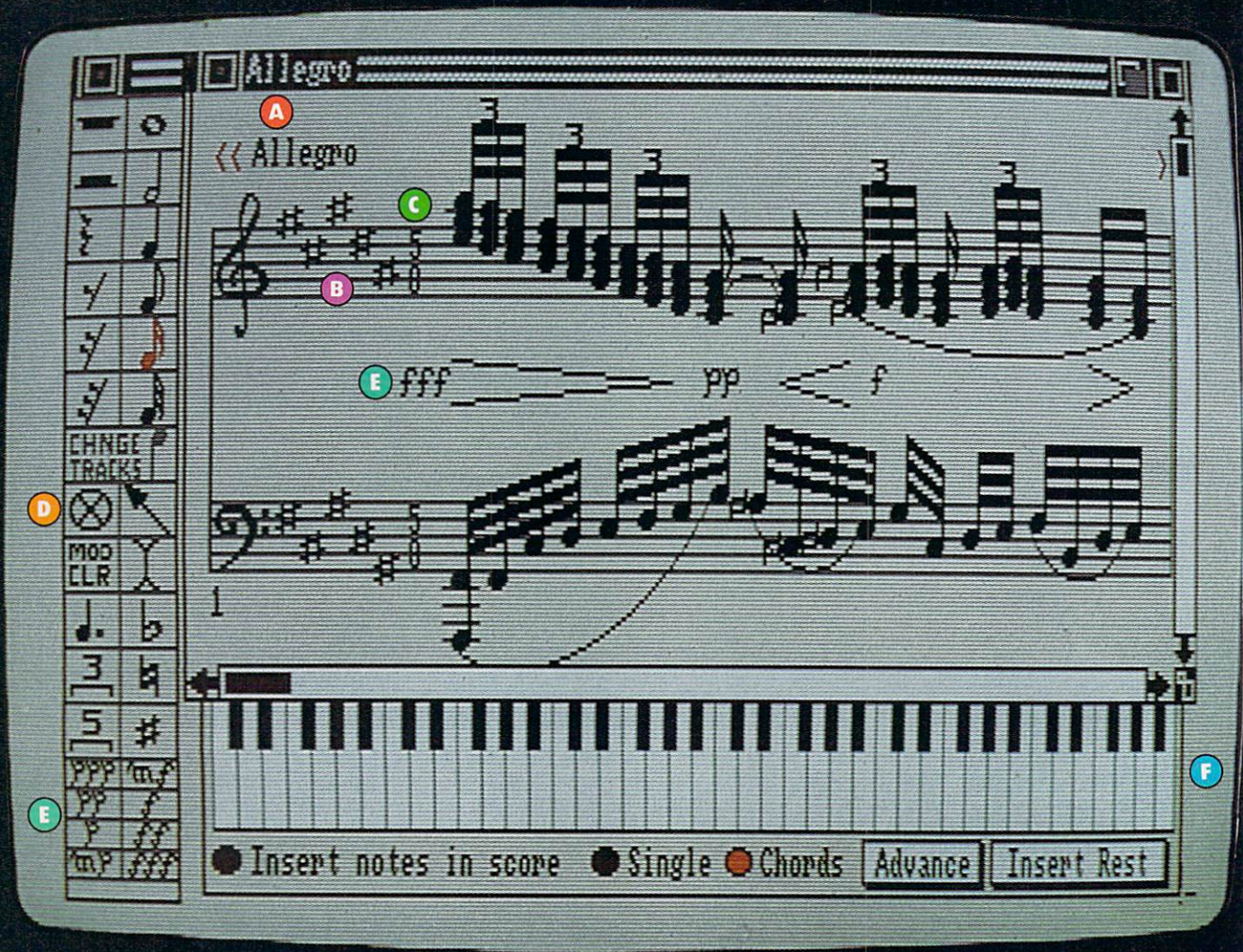
Deluxe Music Construction Set **(Electronic Arts) allows for up to eight staffs per musical score. When you play back a piece of music in *DMCS*, you will see the notes scroll by and the keys on the piano keyboard flash in time with the music.**

A

One of many terms to indicate tempo or speed of a musical piece. *Allegro* means fast.

B

The key signature shows which notes will be sharp or flat. *DMCS* automatically transposes music to any key.



D

Note the Palette Window from which commands and directions are given for the production of tailored musical scores.

E

Dynamic markings show the loudness or softness of the music being played. *DMCS* will alter the volume of the music based on these markings.

to record music into the computer from an electronic keyboard, drums, or guitar. Many music programs for recording and storing music are called "sequencers" because you can use them to put musical notes into sequential order for playback. Some even have a feature that lets you select songs you've stored and play them back in a concert.

HOW ARE INSTRUMENT SOUNDS IMITATED?

Whether or not you can make *your* computer produce different instrument sounds depends on the computer you use and the musical software you run with it. The Apple II series (except for IIGS), IBM PC & compatibles, and Tandy Color Computers are limited when it comes to creating instrument sounds (sound shaping). Other machines, such as the Amiga, Apple IIGS, Atari 520ST/1040ST, C 64/128, and Macintosh, have much more advanced sound-shaping features. (The Atari 8-bit computers fall somewhere in between.)

WHAT DOES THE TERM VOICE MEAN?

The number of "voices" is generally understood to be the number of musical parts that a computer can play simultaneously. This means that a

C

The time signature shows the number of beats in a measure. *DMCS* allows any time signature up to 99/16.

HARDWARE TO IMPROVE THE SOUND OF MUSIC

While your computer may not win any music awards, there *are* several ways to enhance its music-making capabilities. The most common and affordable methods of boosting its musical potential are by adding a circuit board that contains either improved sound chips and/or stereo outputs or by hooking up a piano-like keyboard to your system.

CIRCUIT BOARDS

The Apple II, II Plus and IIe have limited sound features as compared with other machines, such as the Amiga or C 64. The **Mockingboard**, from Sweet Micro Systems (50 Freeway Drive, Cranston RI 02920; [401] 461-0530), gives your Apple the ability to play stereo music, sound effects, and voice synthesis. Many popular programs are compatible with the Mockingboard (for example, *Music Construction Set* and *Zaxxon*).

Some IBM PC and Personal System/2 Model 30 and compatible owners can also use the new **IBM Music Feature** card, from IBM Corporation (Customer Relations, 1000 N.W. 51st St., Boca Raton, FL 33432; [800] 447-4700), which generates up to 336 musical sounds and plays up to eight voices simultaneously.

Another popular add-on music and speech synthesizer for Apple II computers is the **Echo Plus** from Street Electronics (P.O. Box 50220, 1470 E. Valley Road, Santa Barbara, CA 93150; [805] 565-1612). Like the Mockingboard, the Echo Plus is a speech, music, and sound synthesizer that you can use with compatible programs or BASIC. (The IIc version is called the Cricket.)

KEYBOARDS

There are two types of keyboards that you can connect to your computer system: MIDI and nonMIDI. The nonMIDI type of keyboard, such as the **Melodian Keyboard** (Melodian Systems, Inc., 11 E. 47th St., New York, NY 10019; [800] 327-4566) comes with a custom interface for connecting it to a Commodore 64 or 128 and software that lets you use the keyboard. The problem with nonMIDI keyboards is that they can be used only with the bundled software, and they can only be used with the specified computers. On the other hand, MIDI-compatible keyboards can be used with any of hundreds of MIDI-compatible programs, and it's easy to connect them to any microcomputer through a suitable MIDI interface. The two main companies making MIDI keyboards priced for the amateur are Casio, Inc. (15 Gardner Road, Fairfield, NJ 07006; [201] 575-7400), makers of the **CZ-101** and the **CZ-230S** and Yamaha Music Corp. USA (P.O. Box 6600, Buena Park, CA 90620; [714] 522-9011), manufacturers of the **DX100**. These three keyboards cost between $250–$450 and, depending on where you buy them, include high-quality sound-synthesis features for creating and emulating different instrument sounds. Other features found on most MIDI keyboards include headphone and line-out jacks, volume controls, and tuning options.

MIDI INTERFACES

If you decide to go for a MIDI-equipped instrument, you'll also need a MIDI interface, available for most machines for $50–$300. Major players in the MIDI interface market are Dr. T's (220 Boylston, Suite #306, Chestnut Hill, MA 02167; [617] 244-6954), Passport Designs, Inc. (625 Miramontes St., #103, Half Moon Bay, CA 94019-3647; [415] 726-0280), and Roland Corp. (7200 Dominion Circle, Los Angeles, CA 90040; [213] 685-5141). Most MIDI interfaces look like expansion boards or cartridges, and they sometimes come in separate boxes with plugs for interfacing cables. The typical configuration of a MIDI interface is to have one "MIDI-in" jack for your computer and one "MIDI-out" jack for your MIDI-equipped instrument. Some MIDI interfaces have a "MIDI thru" for chaining several instruments and computers together or a few "MIDI out" jacks for connecting up more than one keyboard.

F

Here's an on-screen replica of a piano keyboard. It's used to enter notes by clicking on the keys with the pointer (controlled by a mouse), just as you would play a piano. When you play back the music, the keys on the keyboard also flash in time with the music as the notes scroll by.

computer with three voices can play up to three-part harmony. It is possible, however, through clever programming, to trick some computers into thinking that they have more voices than they really do. *(See* Apple Harmony, *a program that appeared in our August 1986 issue.)*

DO COMPUTERS COME WITH SPEAKERS FOR PLAYING MUSIC?

Most personal computers—except for the Apple II series, Macintosh, and IBM PC & compatibles—don't have built-in speakers for reproducing music and sound effects. Instead, the sound must run through a cable to a video monitor that has a speaker (many monochrome monitors don't), a television, a stereo system, or stand-alone speakers.

CAN I USE MY COMPUTER TO PRINT SHEET MUSIC?

You can use your computer to print sheet music if you have a properly interfaced dot-matrix printer and a music program with a printing option. If a program does support printing, you need to determine if your printer is compatible with the program. Some music-software manufacturers offer regular software updates that work with previously unsupported printers.

WHAT IS MIDI?

MIDI, which stands for *Musical Instrument Digital Interface*, isn't a computer, an instrument, or a cable; it's a standard, a common language. Because of this international standard, many instruments can communicate with each other and with computers. If you have a MIDI instrument—such as an electronic keyboard—a MIDI interface, and MIDI-compatible software for your computer, then you can transfer information back and forth between your keyboard and your computer. The information coming from the keyboard might identify which notes were pressed, how hard, and when.

A GUIDE TO GREAT MUSIC SOFTWARE

Programs to Help You and Your Computer Compose, Perform, Play, and Do More

The Advanced Music System. Icons and menus make this powerful music system a breeze to use. The package includes a music editor, a sound editor, MIDI compatibility, and a printing module that lets you print out musical files with lyrics. Music files from the music editor can be "chained together" in any order to produce full-length compositions. From Firebird Licensees, (201) 444-5700; for C 64/128; $80.

Bank Street MusicWriter. Like *Bank Street Writer*, its word-processing counterpart, this program is simple to use. Instructions come in a bound book and carefully explain how to enter, save, load, and play back songs. You can also create your own instrument sounds and print musical scores to a dot-matrix printer. From Mindscape, Inc., (312) 480-7667; for Apple II Plus/IIe/IIc, Atari 800, C 64/128, IBM PC/PCjr; $50.

Beatles Song Album. Contains many of your favorite Beatles songs. Using your computer, a MIDI interface, MIDI instrument, and stereo, you can bring John, Paul, George, and Ringo right into your living room. Parents: Here's your chance to introduce your kids to the music of the FAB FOUR! From Passport Designs, Inc., (415) 726-0280; for Apple IIe, C 64/128; $35.

Deluxe Music Construction Set and **Deluxe Music Construction Set 2.0.** These are the "big brothers" of the original *Music Construction Set*. They run on more powerful computers and have the extra features to show for it. They have mouse control, four-voice sound, advanced printing features (including lyrics, fonts, and styles), and powerful dynamic control. From Electronic Arts, (415) 571-7171; for 512K Amiga, 512K Macintosh; $100.

Elements of Music. An entry-level, musical-notation program for children and adults. Random drills, either timed or untimed, are provided for naming both major and minor key signatures and notes from a musical staff or a keyboard. Includes progress tests for each drill and progress reports for the student. From Electronic Courseware Systems, (217) 359-7099; for Apple II Plus/IIe/IIc, C 64/128, IBM PC/PCjr, Tandy 1000; $40 (set of three disks, $100).

Guitar Wizard. Whether you're a beginning guitarist or a practiced musician, you can benefit from this program. Designed to help you learn and analyze scales, chords, and tunings, as well as develop music-theory knowledge without needing to read sheet music. Great graphic displays illustrating the guitar neck make your new-found knowledge easy to transfer to the guitar. From Baudville, (616) 957-3036; for Apple II Plus/IIe/IIc/IIGs, Atari, C 64/128, Macintosh; $30—$35.

Instant Music. Use your mouse to choose sounds by drawing a line and choose instruments by picking a color. Includes everything you need to produce recordings, including overdubbing and music splicing. Will play digitized instruments and voices; dozens of songs come on disk. From Electronic Arts, (415) 571-7171; for 512K Amiga; $50.

Making Music on Micros. This disk/book package is an easy-to-understand guide to computer programming and fundamental music theory. Over 50 music programs are included on the disk. The book contains a step-by-step programming tutorial covering use of BASIC commands and subroutines for playing music and drawing staffs, clefs, and notes. From Random House Software, (212) 872-8038; for Apple II/II Plus/IIe/IIc, IBM PC; $70.

Music Construction Set. This classic program by software designer Wil Harvey introduced the construction-set idea to microcomputer maestros. Move notes around, select instruments, and change settings, all with the shift of a joystick, scratch of a Koala Pad, or press of a button. Save your creations and, with a compatible printer, print a musical score. From Electronic Arts, (415) 571-7171, for Apple IIGs enhanced version, $50; Apple II Plus/IIe/IIc, Atari 800, C 64/128, IBM PC, $15.

The Music Studio. Paint your way to great music. Created by the same programmers who designed the *Koala Painter Software*, this program lets you use your Koala Pad, joystick, or mouse to make selections and "paint" music up and down the staff and then instantly play it back. From Activision, (415) 960-0410; for Amiga, Apple IIGs, Atari 800 and ST, C 64/128, IBM PC, Tandy 1000; Koala Pad, joystick, or mouse required; $35—$80.

Q-R-S Music Disks. These disks were digitized from the famous Q-R-S Player Rolls for player pianos. Included are actual performances by pianists ranging from Scott Joplin and Fats Waller to Liberace and Peter Nero. From Q-R-S, distributed by Micro-W Distributing, (201) 838-9027; for Amiga, Apple II Plus/IIe/IIc, Atari ST, C 64/128; MIDI instrument required; $20.

SoundBuster Music System. Convert your Apple II Plus or IIe into a digital-sampling synthesizer with a sound editor and a music sequencer. The "digital sampling" feature means that you can record your own voice, among other sounds, and play it back as an instrument. From YAM Educational Software, (415) 349-8988; for Apple II Plus/IIe; microphone and speakers or stereo required; $100.

Sonix. With *Sonix* you can combine multiple instrument and custom sounds and play them back using either the Amiga's stereo external sound connections or the built-in MIDI controller. *Sonix* uses an on-screen editing system that shows each note as it's entered in the composition. Use one of the preprogrammed instruments, or create custom instruments using *Sonix*'s instrument-editing system. From Aegis Development, (213) 392-9972; for Amiga; $80.

EDITOR'S NOTE: *Titles for IBM PC/PCjr will also run on many IBM compatibles.*

You can save that information onto a disk, and then the keyboard will replay it by itself.

Buying a MIDI interface means finding one that is specially designed for your computer. These interfaces are available for most popular computer brands at music stores. One thing to consider when buying a MIDI interface is how many MIDI instruments you plan to hook up at once. With a MIDI interface and a MIDI thru box, it's easy to connect several MIDI instruments.

HOW CAN I IMPROVE MY COMPUTER'S SOUND?

Probably the best way to make your computer sound better is to hook it up to your stereo system. If you have an Apple II/IIc/IIe, IBM PC or compatible, Tandy Model III or 4, or a Tandy Color Computer, you can purchase an extra hardware product—such as an add-on sound board—to give your system stereo output and improved sound quality. (*See "Hardware to Improve the Sound of Music" for specific products and companies.*) Once you have installed this product, you can connect your computer to the input jacks on your stereo.

If your computer already has a sound chip and a sound output jack, then you can plug a sound cable, which normally runs to your video monitor, into the inputs on your stereo. This lets you hear the sounds made by your computer through both of your stereo speakers; this also makes it easy to record monophonic music from your computer onto a stereo tape recorder.

WHERE CAN I BUY MUSIC HARDWARE AND SOFTWARE?

Music hardware and software are available in computer, department, book, and music stores. The first three types of stores primarily carry top-selling, nonMIDI programs and hardware (add-on sound boards and low-cost add-on keyboards). Music stores carry the software, hardware, interfaces, and musical instruments for building a MIDI music system. Many music stores have computer-music specialists who can help you configure a complete system for your home.

WHAT'S THE COST TO CREATE A COMPUTERIZED MUSIC SYSTEM?

To configure the music system of your dreams, you may have to dip into your pocket a little. Most music programs fall into the $25–$100 range. Some professional MIDI programs, however, retail for hundreds of dollars. You can expect to pay close to $100 to add hardware that gives your computer new sound chips and stereo outputs. A MIDI interface may cost between $50 and $300. You can find non-MIDI add-on keyboards for $25–$250 that include any interfaces you need. MIDI-equipped keyboards and drum machines (minus a MIDI interface) run from as low as about $350 to as high as tens of thousands of dollars. (*See "Hardware to Improve the Sound of Music" for manufacturer information.*) FC

YOUR COMPUTER'S BUILT-IN MUSIC CAPABILITIES

The music that you can make is largely controlled by your computer's sound capabilities. Whether you plan to buy packaged music software or write your own, you should know something about your machine's music-making abilities.

Apple II Plus/IIe/IIc: These three Apples contain a tiny speaker (only the IIc has a volume control), and sounds are generated by programming the computer to send rapid successions of "clicks" to the speaker. Since these models have only one voice, you can play only one musical part at a time. (*Using* Apple Harmony, *a program in the August 1986 issue, it is possible to program harmonies.*) Or you can expand the music capabilities of Apple II series machines to six-voice stereo by adding a Mockingboard or Echo Plus. (*See "Hardware to Improve the Sound of Music."*)

Apple IIgs: The Apple IIGS, the newest member of the Apple II family, has arguably the best built-in sound features of any microcomputer on the market. The secret of the great sound is the Ensoniq sound chip, the same chip built into Ensoniq digital synthesizers. The GS can play up to 15 separate musical instruments simultaneously, as well as emulate human voices and instruments in an impressively realistic way. The real potential of this machine will be actualized when more software and hardware come to market.

Apple Macintosh: The Macintosh can play up to four-part harmony. (This expands up to six with special programming tricks.) You can simulate many different instrument sounds by manipulating the sound waves. The sound coming out of the Mac's tiny, built-in speaker is rather low in volume, but it's easy to plug an external speaker into the jack in the back. Overall volume can be controlled via the Control Panel in the pull-down menu.

Atari 400/800, 600/800/1200XL, 65/130XE: All of the Atari 8-bit computers can play up to four-part harmony, over a range of three octaves (the equivalent of a small 36-key organ). Unlike most other computers, the Atari 8-bits let you change sounds by distorting tones. For instance, you can take one note and make it sound as pure as if it were being played by a flute or as gritty as if it were coming from an electronic guitar. These machines will also generate white noise for drum sounds and explosions.

Atari 520ST/1040ST: These Ataris can cover the whole piano-keyboard spectrum and simulate many different instruments. Three-part harmony can be generated by the ST-series machines. A special plus is the addition of a MIDI interface on the back of the computer. (*See "Hardware to Improve the Sound of Music."*) This interface lets you directly attach MIDI-compatible instruments, without a separate interface.

Commodore Amiga: The only computer we've looked at with stereo sound outputs as standard features, the Amiga can produce realistic-sounding instruments and sound effects. (Like the Mac or ST, the Amiga can digitize sounds.) It can also play four instrument sounds simultaneously, and each of the four instruments can play to a maximum of four independent musical parts with a range of eight octaves.

Commodore 64/128: The C 64 and 128 come equipped with a sound chip called SID (Sound Interface Device), which offers great flexibility in sound generation. With three voices, a range of eight octaves, and control over shaping sounds, it's possible to simulate many different kinds of instruments and sound effects.

IBM PC & compatibles and **IBM Personal System/2 Model 30:** Equipped with a small internal speaker as standard equipment, the IBM PC & compatible machines offer one-voice sound, which is adequate for playing simple melodies. Sound reproduction can be greatly improved with the addition of an IBM Music Feature or another music synthesizer. (*See "Hardware to Improve the Sound of Music."*)

IBM PC*jr* and the **Tandy 1000:** The IBM PC*jr* and Tandy 1000 come with a sound chip that can play three musical voices. If you program music on a PC*jr* using Cartridge BASIC or GW BASIC on the Tandy 1000, you can use PLAY, an advanced BASIC command that gives powerful options when programming music. Another feature of these two systems is that you can play a song in the background while a BASIC program is running. (EDITOR'S NOTE: *To run some music on the Tandy 1000 EX and SX, you need patches for GW BASIC. Write to Radio Shack Customer Service, 400 Atrium, Fort Worth, TX 76102.*)

Tandy Color Computer 3. The CoCo can play one musical voice that spans a four-octave range. In Extended BASIC, you can use PLAY commands to ease the burden of writing long musical arrangements. CoCos manufactured prior to the CoCo 3 will only play music through your television's speaker. The CoCo 3 has a sound output jack to plug into your video monitor.

NEW HARDWARE & ACCESSORIES

EDITOR'S NOTE: *The following hardware announcements are based on literature received from the manufacturers. These are not product reviews.*

Personal Data Pac

MANUFACTURER: Tandon Corporation
ADDRESS: 405 Science Drive, Moorpark, CA 93021; (805) 523-0340
PRICE: Not available at press time. Company says price will be less than $400 and will include MS-DOS and Microsoft's *Windows*.
HARDWARE COMPATIBILITY: IBM PC/XT/AT & compatibles

During the development of the Personal Data Pac, a Tandon employee accidentally dropped the portable disk drive down a flight of wooden stairs; that same disk drive is still in daily use, according to a Tandon spokesperson.

It's this ruggedness that makes the 30MB, 3.5-inch Winchester disk drive truly portable. The fact that the Personal Data Pac weighs in at just 2.5 pounds and fits in the palm (7" x 4.75" x 2.5") means that carrying around a hard-disk drive is convenient for the user. That the disk drive can be jarred and even dropped without damage demonstrates that lugging it around in a briefcase can be easy on the disk drive, too.

Two factors make this possible: the airtight case's design and mounting and the drive's built-in head-locking feature. Besides the Personal Data Pac, the only other portable hard-disk drive for IBM PC owners is the more expensive and less rugged Bernoulli box (about $3,000 for the 40MB version).

You can insert one or two Personal Data Pacs right into a new Tandon PAC 286 AT-compatible, or if you already own an IBM PC or compatible, you can purchase the Ad-PAC 2 (priced around $500), a subsystem that lets you externally attach one or two Personal Data Pacs to your existing system.

Champion

MANUFACTURER: Victor Technologies
ADDRESS: 380 El Pueblo Road, Scotts Valley, CA 95066; (408) 438-6880
PRICE: $799

While few people can determine the number of different brands of PC compatibles that are on the market at any given time, most agree that there are too many to choose from. How can you decide between two machines that are smartly built; come bundled with similar software; and have inexpensive price tags, five expansion slots, and one-year warranties? To solve the dilemma, you may have to take a closer look at the system's manufacturer.

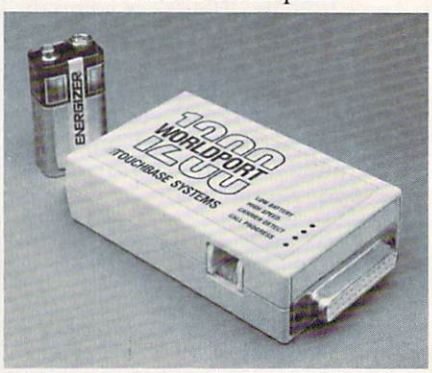
Champion, a new addition to the long list of PC/XT compatibles, would be one of the machines to make the final cut because of its manufacturer, Victor Technologies. While Victor may not be a household name, the 69-year-old company—which began as an adding-machine manufacturer—has become the second leading IBM PC/XT and PC/AT compatible sales leader in Europe.

The Champion, which uses an Intel 8088 microprocessor, comes with 640K of RAM, a detachable PC/AT-style keyboard, one floppy disk drive, five full-size expansion slots, and a monochrome graphics card. The $799 price also includes MS-DOS 3.1, GW BASIC, and *Word Result* and *Calc Result* (a word processor and spreadsheet published by Handic Software of Sweden). A monitor isn't included with the basic unit, although you can purchase a monochrome monitor from the company for $119. (You may also want to buy a second disk drive, available from Victor for $200.)

The Champion is Victor's second line of computers; the company's other line, the Professional Series, currently includes the VPC II, an IBM PC/XT compatible, and the V286, an IBM PC/AT compatible.

WorldPort 1200

MANUFACTURER: Touchbase Systems, Inc.
ADDRESS: 16 Green Acre Lane, Northport, NY 11768; (516) 261-0423
PRICE: $199
HARDWARE COMPATIBILITY: Any computer with an RS232 serial port.



As the concept of computing-on-the-go takes hold, professionals are demanding portability from more than just their computers. Whether you're a businessperson, a journalist, or an accountant, you may need the convenience of a portable printer, disk drive, or modem.

Portable modems are a convenient medium through which traveling professionals can transfer information from their hotel rooms to their offices. A modem is truly portable if it is small and lightweight and if it can be used without an electrical outlet.

One modem that does all of the above is the WorldPort 1200, a battery-powered, Hayes-compatible, auto-dial, auto-answer modem that measures 4" x 2" x 1".

If there isn't an electrical outlet near the telephone, the WorldPort 1200 can be powered by a nine-volt battery. Back on your desk, it can be used with an optional AC adapter. The unit is direct-connect but it also has acoustic cups. That means in places where you can't connect directly to the telephone lines, you can use these cups to hook up to a telephone's mouthpiece.

The portable modem has a two-year warranty that covers defects in materials and workmanship. FC

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Welcome to FAMILY COMPUTING's Software Guide, the most comprehensive listing available of two dozen of the newest, most noteworthy, and/or best programs on the market. Our reviewers include families from all over the country who have judged the software according to the following criteria: long-term benefits and applications, adaptability, and advantages of using a computer for a given task. Programs have been evaluated and rated for their performance in each of the categories listed below. More detailed reviews follow the chart. Unless otherwise noted, all programs are in disk format, and minimum memory requirements are 48K for Apple II series, 48K for Atari, 128K for IBM PC/PC*jr* or compatibles, and 128K for Macintosh. "Atari" alone denotes the 800/XL/XE series. "C 64/128" means the software will run on both a C 64 and a C 128 computer in C-64 mode; "C 128" alone means the software will run only on that machine.

Here's a rundown of the rating categories and what they mean: **O** = Overall performance, given the limitations and capacities of the particular computer for which the software is intended. **D** = Documentation, or the instructions and literature that accompany a program. **EH** = Error-handling, the software's capacity to accommodate errors made by the user—an especially important consideration with software for younger users. **PS** = Play system (in the games reviews), the quality of the game design and the game's playability. **GQ** = Graphics quality, also evaluated in light of each particular brand's graphics capabilities. **EU** = Ease of use after the initial learning period, which varies from computer to computer. **V** = Value for money, or how the software measures up to its price.

EDUCATION/FUN LEARNING

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	EH	GQ	EU	V
BIG BLUE DISK (NOS. 3 & 4) Softdisk, Inc. P.O. Box 30008 Shreveport, LA 71130 (318) 868-7247 $10 each; $70/year ©1986	A monthly magazine-on-a-disk that includes everything from educational software and games to programming hints and computer-product reviews. While some programs were simple, all were polished.† —SUMMERS	256K IBM PC/PC*jr.** Color monitor and graphics adapter recommended. 2nd drive optional.	Unlimited warranty. Not copy-protected.	★ ★ ★	★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★ ★
LIGHTNING LEARNING Artworx Software Company 1844 Penfield Road Penfield, NY 14526 (716) 385-6120 $30 ©1987	Gain insight into memory and forgetting as you develop techniques for improving memory. Weaknesses such as no documentation, baffling clues, and blatant advertising of other company products mar the package. —MORRIS	IBM PC/PC*jr.**	90-day warranty. $5 thereafter. Not copy-protected.	★ ★	○	★	N/A	E	★
THE TALKING COLORING BOOK JMH Software of Minnesota 7200 Hemlock Lane Maple Grove, MN 55369 (612) 424-5464 $30 ©1986	Very young computer users can have fun with this paint program that displays a crayon and the name for its color on-screen, then says it aloud. Very simple, though, so older kids may become bored. —SUMMERS	Amiga.	30-day warranty. $5 thereafter. Not copy-protected.	★ ★	★ ★ ★	★ ★ ★	★ ★ ★	E	★ ★ ★
TICKET TO LONDON Blue Lion Software P.O. Box 650 Belmont, MA 02178 (617) 876-2500 $30-$40 ©1986	Learn your way around London during a 10-day trip; whether or not you get a return ticket depends on how well you answer questions about Britain. Fine fun, but it grows repetitious. —MORRIS	Reviewed on 128K Apple IIe/IIc. Also for C 64/128, IBM PC/PC*jr.**	90-day warranty. $7.50 thereafter.	★ ★ ★	★ ★ ★	★ ★	★ ★ ★	A	★ ★
TYPING INSTRUCTOR Individual Software, Inc. 1163-I Chess Drive Foster City, CA 94404 (415) 341-6116 $50 ©1984, 1985, 1986	Offers logically organized, interactive lessons, a variety of speed-and-accuracy improvement sessions, and an enjoyable game segment. You can write your own test materials, too. —MORGENSTERN	IBM PC/PC*jr.** 2nd drive optional.	90-day warranty. $15 for 21 months thereafter or for backup.	★ ★ ★	★	★ ★ ★	★	E	★ ★ ★

RATINGS KEY **O** Overall performance: **D** Documentation: **EH** Error-handling: **GQ** Graphics quality: **EU** Ease of use: **V** Value for money: ○ Poor: ★ Average: ★★ Good: ★★★ Very Good: ★★★★ Excellent: N/A Not applicable: E Easy: A Average: D Difficult: † Longer review follows chart

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ASCII EXPRESS MOUSETALK United Software Industries 8399 Topanga Canyon Blvd. Canoga Park, CA 91304 (818) 887-5800 $100 ©1987	Communications software that combines the mouse-based convenience of pull-down menus and point-and-click commands with excellent text handling and advanced features.† —MORGENSTERN	128K enhanced Apple IIe/IIc/IIGS. Mouse recommended. 2nd drive optional.	90-day warranty. $15 thereafter. Not copy-protected.	★★★★	★★★★	★★★	N/A	E	★★★
THE CLAN PRACTICAL ACCOUNTANT Sir-Tech Software, Inc. Charlestown Ogdensburg Mall P.O. Box 245 Ogdensburg, NY 13669 (315) 393-6633 $80 ©1986	The publisher claims that this double-entry accounting package is suitable for families and small businesses, but I found it too complex for home use. Unless you're familiar with accounting principles and terminology, you'll probably agree with me. —MORRIS	Reviewed on 64K Apple. Also for IBM PC/PC*jr*.* Printer, 80-column card, monochrome or RGB monitor recommended.	90-day warranty. $7.50 thereafter per disk ($12.50 for both disks). Backup disk included. Not copy-protected (IBM only).	★	★★	★★★	N/A	D	★
GREETING CARD MAKER Activision, Inc. 2350 Bayshore Parkway Mountain View, CA 94043 (415) 960-0410 $35-$40 ©1986	In a software category that has been defined by *The Print Shop*, this variation on the theme has a style all its own. You can create cards in six different shapes, including 3-D.† —MORGENSTERN	Reviewed on C 64/128. Also for 64K Apple. 2nd drive, joystick optional.	90-day warranty. $7.50 thereafter.	★★★	★	★★★	★★★★	E	★★
INTUIT IS-2000 Noumenon Corporation 512 Westline Drive Alameda, CA 94501 (415) 521-2145 $45 ©1985, 1986	This integrated package—with spreadsheet, data base, mail merge, word processor, and more—is marred by its non-standard operating system and terminology. Yet it's powerful and a great value. —KOVACS	256K IBM PC.* 384K and 2nd drive recommended.	1-year warranty. $10 thereafter. Not copy-protected. 30-day money-back guarantee.	★★	★	★★	★	E	★★★★
LOOKING YOUR BEST 1 Step Software, Inc. 510 Griffith Rd. Charlotte, NC 28210 (704) 525-6688 $35 ©1986	Once you've used this feminine apparel guide to print out a list of necklines, skirts, and other clothing details, you'll probably not use it again. Best for adults, not teens. —SUMMERS	256K IBM PC.* Dot-matrix printer or color monitor required. 2nd drive optional.	Unlimited warranty. Not copy-protected.	★	★	★★★★	★	A	★
MICROSOFT WORKS Microsoft Corp. 16011 N.E. 36th Way Redmond, WA 98073 (206) 882-8080 $295 ©1986	What *AppleWorks* is for the Apple II (the best integrated package for both beginners and experienced users), *Microsoft Works* is for the Mac. The manuals are thorough, but dry.† —MORRIS	512K Macintosh. 128K ROM. 2nd drive recommended.	90-day warranty. Not copy-protected.	★★★★	★★★	★★★★	★★★	A	★★★★
TALKER Finally Software 4000 MacArthur Blvd., #3000 Newport Beach, CA 92660 (714) 722-2922 $70 ©1986	A word processor with speech capabilities, *Talker* can handle most basic functions. But all speech is limited to the text you type in; menus cannot be read by the current version.† —SUMMERS	Amiga.	Sold as is. Not copy-protected. 30-day money-back guarantee.	★★★	★★	★★★	N/A	E	★★★
THE TWIN Mosaic Software Inc. 1972 Massachusetts Ave. Cambridge, MA 02140 (617) 491-2434 $99 ©1985	High-powered spreadsheet and business graphics package with a twist—it's a "twin" of Lotus *1-2-3*. The documentation is not accessible to beginners and is filled with errors. —MORRIS	320K IBM PC.* 512K recommended. 2nd drive. Color monitor, graphics adapter, 8087 coprocessor optional.	Unlimited warranty. Not copy-protected.	★★	★	★★★	★★★	D	★★★
VOILA! Target Software Inc. 14206 S.W. 136th St. Miami, FL 33186 (305) 252-0892 (800) 622-5483 $100 ©1986	An outliner that's a desk accessory, so it's always there when you need it—right under the Apple menu. Lets you move any number of headlines when reorganizing your thoughts. While not difficult, it could be smoother to operate. —AKER	512K Macintosh.	Unlimited warranty. Not copy-protected.	★★★	★★★	★★	N/A	A	★★

RATINGS KEY O Overall performance; **D** Documentation; **EH** Error-handling; **GQ** Graphics quality; **EU** Ease of use; **V** Value for money: ○ Poor; ★ Average; ★★ Good; ★★★ Very Good; ★★★★ Excellent; N/A Not applicable; E Easy; A Average; D Difficult; † Longer review follows chart

*Titles listed for the IBM PC/PC*jr* will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

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ENTERTAINMENT

Title Publisher Price	Brief description	Hardware/ Equipment required	Backup policy	Ratings O	D	PS	GQ	EU	V
221 B BAKER ST. Datasoft/IntelliCreations 19808 Nordhoff Place Chatsworth, CA 91311 (818) 886-5922 $30-$40 ©1986	Adapted from the board game, this mystery combines animation, voice synthesis, and graphic adventure-style art in the best Sherlock Holmes game ever. Gives you 30 crimes to solve.† —ADDAMS	Reviewed on C 64/128. Also for Apple, Atari, Atari ST, IBM PC.* Joystick optional.	6-month warranty. $7.50 for backup.	★★★	★★	★★★	★★★	A	★★★
THE BARD'S TALE II Electronic Arts 1820 Gateway Drive San Mateo, CA 94404 (415) 571-7171 $40-$45 ©1986	You and your heroic party of adventurers are back in business. You'll meet strange creatures, most of whom would rather see your bones mouldering in some cavern than give you the time of day.† —DELSON	Reviewed on C 64/128. Also for 64K Apple.	90-day warranty. $7.50 thereafter.	★★★★	★★★★	★★★★	★★★★	A	★★★★
DARK CASTLE Silicon Beach Software P.O. Box 261430 San Diego, CA 92126 (619) 695-6956 $50 ©1986	With rocks as your sole weapons, you roam the castle in search of the dreaded Black Knight. The digitized sounds—such as rats scurrying and the beating of bat wings—make this adventure come alive. —AKER	512K Macintosh. 2nd drive.	90-day warranty. $5 thereafter. Not copy-protected.	★★★★	★	★★★★	★★★★	A	★★★
GFL CHAMPIONSHIP FOOTBALL Gamestar/Activision 2350 Bayshore Parkway Mountain View, CA 94043 (415) 960-0410 $35-$45 ©1986	Whether you're scooping up a kick return or receiving a long pass in a complex curl-out play, this program places you in the middle of the action better than any previous football game.† —DELSON	Reviewed on C 64/128. Also for Amiga, Apple, Atari ST, IBM PC/PC*jr*.* Joystick.	90-day warranty. $7.50 thereafter.	★★★★	★★★	★★★★	★★★★	A	★★★★
HOLLYWOOD HIJINX Infocom 125 Cambridge Park Drive Cambridge, MA 02140 (617) 492-6000 $35-$40 ©1986	A good time is in store for text-adventurers with a wild sense of humor. Ten treasures are hidden in a Malibu mansion, and you'll inherit the estate and your uncle's movie studio if you find them all by morning. —ADDAMS	Reviewed on 512K Macintosh. Also for Amiga, 128K Apple IIe/IIc, Atari, Atari ST, IBM PC/PC*jr*.*	90-day warranty. $5 thereafter. Not copy-protected.	★★★	★★★★	★★★	N/A	A	★★★
MIGHT AND MAGIC New World Computing P.O. Box 491415 Los Angeles, CA 90049 (213) 659-1888 $55 ©1985	This fantasy role-playing game spans 55 monster-filled mazes, 20 of which are outdoors instead of in the usual dungeons. Inventive magic and intricate graphics help make this tough game special. —ADDAMS	64K Apple.	90-day warranty. $5 for backup.	★★★	★	★★★★	★★★★	E	★★
PATTON VS. ROMMEL Electronic Arts (see above for address and phone) $40 ©1986	Hypothetical war game pits World War II's greatest armored commanders against each other in the hedgerows of Normandy. Animated graphics show battles in action. —DELSON	512K Macintosh.	90-day warranty. $7.50 thereafter.	★★★★	★★★★	★★★★	★★★★	A	★★★★
RING QUEST Origin Systems, Inc. 136 Harvey Road, Bldg. B Londonderry, NH 03053 (603) 644-3360 $20 ©1986	A graphic adventure set in the land of Balema, where you must rescue a sorceress from the evil influence of the Ring of Chaos. Two arcade games are built into the adventure. —ADDAMS	64K Apple. 2nd drive optional.	90-day warranty. $5 thereafter.	★★	★★★	★★★	★★	A	★★★
TIME BANDIT MichTron 576 S. Telegraph Pontiac, MI 48053 (313) 334-5700 $40 ©1985	Working alone or in a clever 2-player mode, you must survive 16 different arcade "lands," each with 16 levels. Each land is borrowed from another arcade game, such as *Pac-Man*.—DELSON	Atari ST. Joystick recommended.	30-day warranty. $5 thereafter.	★★★	★★	★★	★★★	E	★★
WARSHIP Strategic Simulations Inc. 1046 N. Rengstorff Ave. Mountain View, CA 94043 (415) 964-1200 $60 ©1986	A highly detailed play system, which determines the outcome of every shot and torpedo fired, makes this naval war game special. Graphics are simple, but clearly understandable. —DELSON	Reviewed on C 64/128. Also for Apple, Atari.	30-day warranty. $10 thereafter. Not copy-protected.	★★★	★★★★	★★★★	★★	A	★★

RATINGS KEY **O** Overall performance: **D** Documentation: **PS** Play system: **GQ** Graphics quality: **EU** Ease of use: **V** Value for money: ○ Poor: ★ Average: ★★ Good: ★★★ Very Good: ★★★★ Excellent: N/A Not applicable: E Easy: A Average: D Difficult: † Longer review follows chart

*Titles listed for the IBM PC/PC*jr* will also run on many IBM PC compatibles; owing to the proliferation of compatibles, check with the publisher of the program or your dealer for compatibility.

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SOFTWARE REVIEWS

On the following pages, you'll find in-depth reviews of some of the programs listed in the Software Guide. Refer back to the Guide on page 42 for information such as backup policies and addresses of software publishers.

EDUCATION/ FUN LEARNING

Big Blue Disk, Nos. 3 and 4

HARDWARE REQUIREMENTS: 256K IBM PC/PCjr.
PUBLISHER: Softdisk, Inc.
PRICE: $10 each; $70 per year

Software prices *have* been improving, but programs for less than a dollar each? Seeing is believing when you try *Big Blue Disk*, a monthly magazine-on-a-disk that offers games, educational programs, product reviews, programming utilities, and even commercial programs. We gave Issues 3 and 4 the works and had more fun than an ant at a picnic.

Big Blue Disk imitates a magazine format with monthly features that include a computer-industry news column and "The Happy Hacker"—a section for programming hints and utility routines. However, instead of feature articles, *Big Blue Disk* offers programs. Both of the issues we saw had two games and at least one program each in the educational, graphics, and productivity software categories. None of the programs was a Lotus *1-2-3* or a *King's Quest*. In fact, one of the programs did nothing more than figure out phone numbers from letters—you know, the "dial 1-800-BUY-JUNK" kind. But although the programs were simple, all were polished and reasonably well debugged.

Big Blue Disk is published in Cajun country, where it's traditional to throw in a little bit extra for "lagniappe"—just for good measure. That may explain the monthly bonus Blue Plate Special, actual commercial software that's bundled with the 10 to 20 items on the main disk. Issue 3 came with an assortment of excellent teaching modules from Cross Educational Software, while Issue 4 offered *PC Write*, the shareware word processor that recently went commercial.

If we had to choose between Issues 3 and 4, we'd pick 3. We had more fun with its games and got more use out of the Cross educational programs than we did with *PC Write*, since we already have a word processor that meets our needs. Number 3 also included a sophisticated hurricane tracker, something we Cajuns find useful this time of year. But we'd rather not choose. In fact, we're going to subscribe. Where else can you get games for a dollar apiece and lagniappe besides? —TAN A. SUMMERS

HOME BUSINESS & PRODUCTIVITY

ASCII Express MouseTalk

HARDWARE REQUIREMENTS: 128K enhanced Apple IIe/IIc/IIGS.
PUBLISHER: United Software Industries
PRICE: $100

This communications program offers a wonderful combination of convenience and features, with a minimum of intimidating technical jargon. (It comes from the publishers of the original *ASCII Express*, but is a totally new product.) Mouse control streamlines the decisions involved in connecting to data services, bulletin boards, or other personal computers. The pull-down Macintosh-style menu bar at the top of the screen includes all of the commands you'll need, logically organized by function.

While the program can be controlled without a mouse, it's not as convenient to use that way as are programs designed specifically with keyboard commands in mind. On the plus side, however, mouse users will find it handy to call frequently used commands directly with a combination of the OPEN-APPLE key and letter commands.

Several features make text handling especially simple. A built-in editor won't replace your word processor, but it's more than sufficient for composing messages for uploading or for editing incoming text files. Incoming files can be sent directly to disk, the editor, or a printer. Another nice flexibility feature is the fact that you can use the editor while still on-line.

As your expertise grows, *MouseTalk* offers a host of sophisticated features, including emulation of a wide range of telecommunications terminals. It's relatively simple to construct log-in files to dial and sign on to any on-line services. The program's macro capability allows you to automate a number of operations, including file downloading.

All in all, I couldn't find anything I wanted to do with my modem that *MouseTalk* didn't support with a minimum of fuss. Topping it off is an excellent manual that goes the extra distance to explain the basics at every step, yet is good enough for no-nonsense reference and includes a worthwhile index. The program is highly recommended.

—STEVE MORGENSTERN

Greeting Card Maker

HARDWARE REQUIREMENTS: 64K Apple, C 64/128.
PUBLISHER: Activision
PRICE: $35–$40

Roses are red, violets are blue, *The Print Shop* is fun, and this program is, too.

Unlike *The Print Shop*, however, *Greeting Card Maker* just makes cards—no banners, posters, or letterhead paper. But it does offer a wide variety of card styles, with six different shape possibilities, including some 3-D pop-up designs.

Greeting Card Maker expects you to take the paper out of your printer after printing one side, turn it over, and reinsert it to complete the printing process. This allows you to place type and graphics on any side of the card, opening up some attractive design possibilities. The program supports most popular printers and interfaces, and the results we achieved, even on our inexpensive printer, were handsome.

There are lots of decorative choices to explore. You can decide on a background color (if you have a color printer), a background pattern, full-panel pictures, border designs, some decorative images in pre-established groupings, and other images that can be placed anywhere you want. The program comes with a substantial assortment of graphics, and there are several ways to incorporate outside artwork. For example, Com-

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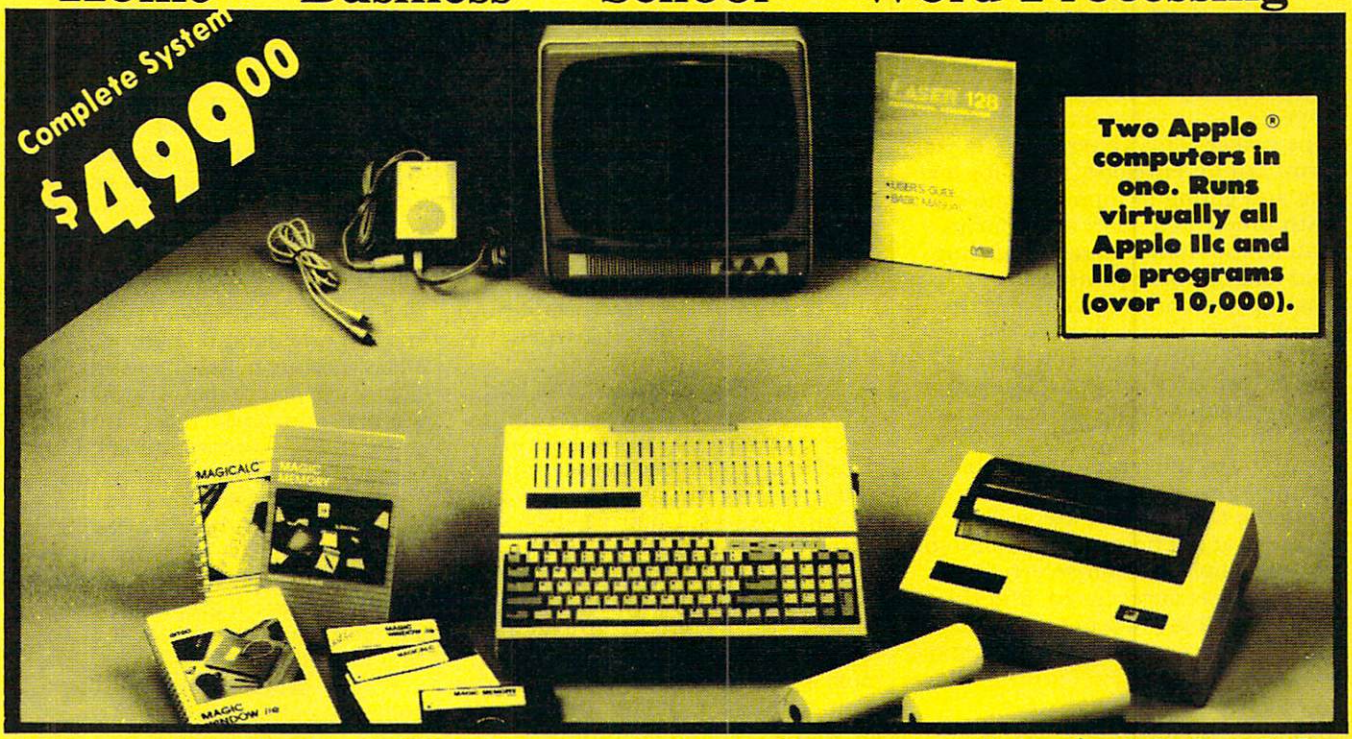

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modore users can clip full-panel pictures out of images created with the popular *Doodle!* drawing program, while Apple users can import any high-resolution picture.

A particularly valuable feature is the ability to preview your card on-screen, with all text and graphics in place. In contrast, one of the more ambitious and less successful aspects of the program is the envelope maker. This clever idea lets you print out an envelope, ready for folding and gluing or taping, complete with preprinted address. Unfortunately, the instructions for cutting and folding these printed sheets into envelopes are inadequate, and the results were sloppy at best.

The documentation could be much better, too. Methods for folding and printing cards are poorly explained, and the graphics included with the program are not reprinted in the manual for easy reference. Still, *Greeting Card Maker* was well-received at my house. The ability to see the whole card on-screen before printing was appreciated, and the design flexibility led to quality results. —STEVE MORGENSTERN

Talker

HARDWARE REQUIREMENTS: Amiga.
PUBLISHER: Finally Software
PRICE: $70

Talker is a complete writing tool for most basic word-processing needs. It delivers a useful range of editing features, including automatic formatting for inserting new text, cut-and-paste, and search-and-replace. On-screen, you see exactly how any document will look when printed—and, as its most individual feature, this word processor will read aloud anything you've written.

At our house, someone uses a word processor almost every day. The children, using the computer for writing school reports and an occasional short story, don't want to learn complicated word-processing commands. *Talker* is perfect for them, since all commands can be selected from standard Amiga drop-down menus. A function key menu that lists some of the most frequently used commands can be displayed at the bottom of the screen as well.

All that mouse control can be annoying to a fast typist—like me. So I was glad to see that most *Talker* commands can also be initiated from Amiga-key combinations, keeping my hands on the keyboard and my temper under control. The only task I routinely perform that was beyond *Talker*'s ability was preparing files for transmission by modem. Even its text-only save option introduced stray characters that scrambled every transmission.

Talker's speech capability was entertaining for the children, but not as practical as might be hoped. It can read text word-by-word, letter-by-letter, sentence-by-sentence, or in any combination of the three. However, the word and sentence modes slow the program to a 20 word-per-minute crawl, making them most appropriate for beginning typists who want audible feedback.

The computerized speech is fairly easy to understand. Speech can be toggled on and off, and a control panel lets you choose between male and female as well as "robotic" and "natural" voices. Unfortunately, *Talker* can read only text files, not its own menus. That makes it practically useless for the visually handicapped, the one group for whom a talking word processor makes the most sense. However, it's a good program for those learning to type and for young children beginning to write. —TAN A. SUMMERS

Microsoft Works

HARDWARE REQUIREMENTS: 512K Macintosh.
PUBLISHER: Microsoft Corp.
PRICE: $295

In one, easy-to-use package, *Microsoft Works* integrates a word processor, data base, and spreadsheet with graphics, as well as a basic telecommunications module. Since *Works* files are compatible with Microsoft's programs (such as *Word* and *Excel*), as well as other programs, you can easily upgrade to more sophisticated packages if the need arises. But most people will probably never choose to go beyond *Works*. Here's a look at what it offers.

In addition to all the usual features, the word processor offers headers and footers, mail merge, and sophisticated search-and-replace routines. Graphic capability is limited, but drawings can be incorporated from *MacPaint* or *MacDraw*, and graphs can be transferred from the integrated spreadsheet. Manuscript length is limited only by your computer's memory; on the 512K Macintosh that limit is about 70 pages, enough for most mortals.

The data-base portion of *Works* is similarly accommodating. Each record can consist of as many as 60 fields (using up to 248 characters per field). With an average record of 100 characters, it's possible to store 2,000 records in memory (or up to 6,000 with a Mac Plus). When using large data-base files, you can split the screen to view various parts of the file simultaneously. Extremely complex searches can be conducted and the results saved in subfiles.

The spreadsheet is a comfortable 256 columns by 9,999 rows, again more than enough for most applications. Formulas as long as 200 characters are acceptable; and, to simplify your task, *Works* includes more than 50 preprogrammed functions. By dividing the screen into panes, it is possible to see side-by-side portions of the worksheet that are otherwise far apart. When you're ready, you can translate the spreadsheet data into a graph—bar chart, pie chart, line chart, stacked chart, or a combination.

Finally, *Works* contains a basic communications module. This seems to be the weakest part of the package, although it will suffice for general use. Auto dialing is provided, as is file uploading and downloading (including background file transfer as you work with other sections of *Works*). But the capacity to customize the software to fit individual needs is limited.

The documentation is very good, although in its thoroughness it tends to be dry and tedious. A complete tutorial is provided that makes it possible for even the least experienced beginner to get started. In addition, a thorough reference manual is provided for experienced users.

Our 15-year-old, Matt, has been using *Works* for six months. He notes: "It's great to have everything in one package. Each of the parts has extra convenience features that save time and space. It's not intended especially for graphics . . . and it does take a while to really learn how to use it. But beyond that, it's everything you need for the Mac . . . all other programs suffer by comparison."

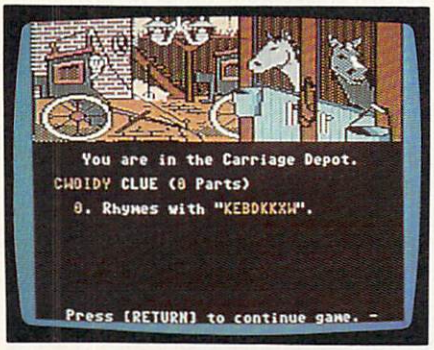
That's strong praise from a student who paid for the software with his own, hard-earned money.

—TONY MORRIS

ENTERTAINMENT

221 B Baker St.

HARDWARE REQUIREMENTS: Apple, Atari, Atari ST, C 64/128, IBM PC.
PUBLISHER: Datasoft/IntelliCreations
PRICE: $30–$40



Of the dozen or more Sherlock Holmes games I've played, this is my favorite. Adapted from a conventional board game, it blends elements of a graphic adventure into a computer board game for one to four people. First you choose a character: Holmes, Watson, Inspector Lestrade, or Irene Adler. Each is distinctly depicted and animated on the board, the squares of which represent London city blocks.

Next you select one of 30 crimes to solve, and players press a key or the joystick button to determine how many squares to move on each turn. After entering a building—perhaps a pawn shop or tavern—you are greeted with a finely styled illustration of the room. Clues are revealed in text that appears below the picture, while background information on the characters involved in each crime is found in the Case Book. In some locations you're greeted with vivacious voice synthesis from a barmaid or other Londoner, whose exclamations are startlingly clear and articulate. (There's no speech in the Apple or IBM versions, though.)

When you think you have deduced "whodunit," head back to 221 B Baker Street to take a multiple-choice quiz that asks you to pick the killer, the motive, and murder weapon. If you miss any questions, you'll find out how many you answered correctly but not which ones. You may retake the quiz after trekking back to Scotland Yard for another badge. The crimes are not hard-core brain twisters and can usually be solved with deductive reasoning.

This can be good rainy-day fun, but the challenge of competing

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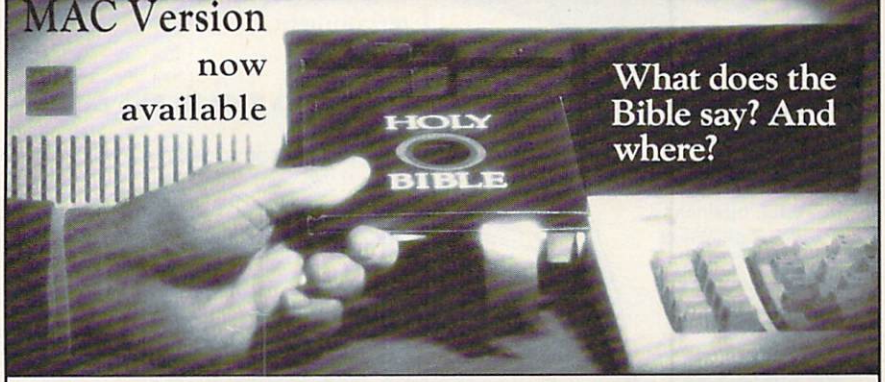

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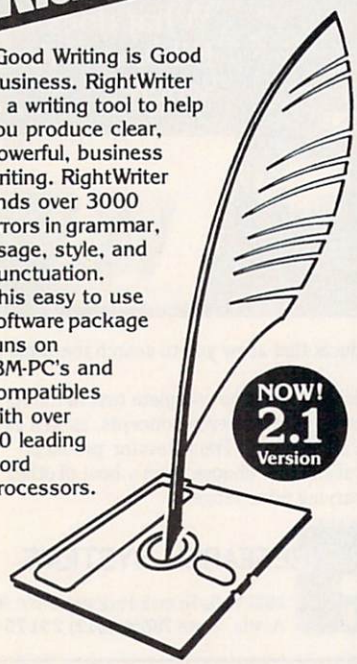

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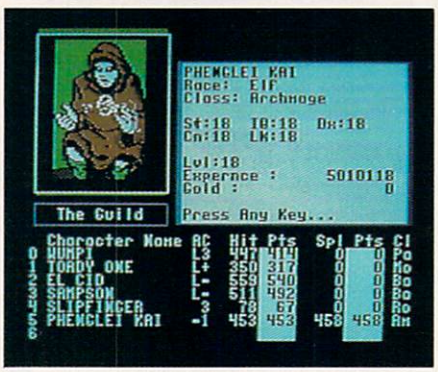
SOFTWARE REVIEWS

against other detectives makes this game best for groups. It is especially well-suited for family and party entertainment. —SHAY ADDAMS

The Bard's Tale II: The Destiny Knight

HARDWARE REQUIREMENTS: 64K Apple, C 64/128.
PUBLISHER: Electronic Arts
PRICE: $40–$45

Having triumphed over numerous evil enemies in *The Bard's Tale* wasn't enough for you, was it? Apparently not, because you and your heroic party of adventurers are back in business again in the sequel, *The Bard's Tale II: The Destiny Knight*. Once again you have been called upon to fight for right, justice, and the medieval way, as you hack your way through even worse monsters than before; map every step you take through towns, dungeons, and the wilderness; and collect fragments of a great and powerful Destiny Wand that is needed to restore order.



The game starts off with a simple dungeon, then sends you out to discover and gather the fragments of the Destiny Wand. You can explore six cities, you must survive 25 dungeon levels, and you fight up to 100 kinds of monsters. You'll meet strange and fascinating creatures in your travels, most of whom would rather see your bones mouldering in some cavern than offer you the time of day. But if you're brave, and a bit foolhardy, you'll prevail.

Don't expect *The Destiny Knight* sequel to be over quickly. With puzzles galore and more spells than you can ever hope to use in any given play session, set aside anywhere from 300 to 400 hours to achieve your destiny. For those of you who enjoy adventuring, you'll be happy the game takes so long to end.

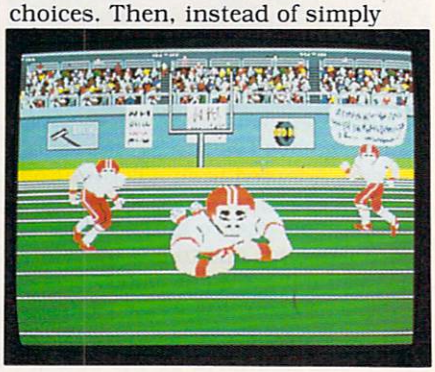
—JAMES DELSON

GFL Championship Football

HARDWARE REQUIREMENTS: Amiga, Apple, Atari ST, C 64/128, IBM PC/PC*jr*.
PUBLISHER: Gamestar/Activision
PRICE: $35–$45

Whether you're scooping up a kick return to try for a great broken field run, receiving a long pass in a complex curl-out play, or trying to carry the ball on a sweep right, *GFL Championship Football* places you in the middle of the action.

The offense can run 34 different plays, from complex passing maneuvers to runs and kicking options, while the defense has a dozen choices. Then, instead of simply



watching the play from the sidelines or an overhead view (as in all other football games), you're put in the midst of the action, participating in each play with an "in-helmet" view.

You begin by selecting from a roster of 27 teams in four divisions, with each team having its own strengths and weaknesses to provide play balance. After the kickoff, the offense is given 30 seconds to choose a play from a scrolling list of options. The defense has far less time to choose a response. Next, you switch to a screen showing the offensive player's point of view (inside the quarterback's helmet on running plays, the receiver's on passing plays, and the kicker's on kicking options). After the ball is snapped, you must move the joystick, and sometimes use its button, with great precision in order to complete the play properly.

The documentation gives step-by-step instructions on how to make each play. With more than 40 plays to learn, it takes a long time to achieve proficiency, but it pays off with many hours of fun. Superb graphics (linemen literally throw themselves at you!), scrolling animation, and good sound effects make *GFL Football* ideal for gamers at all ability levels. —JAMES DELSON

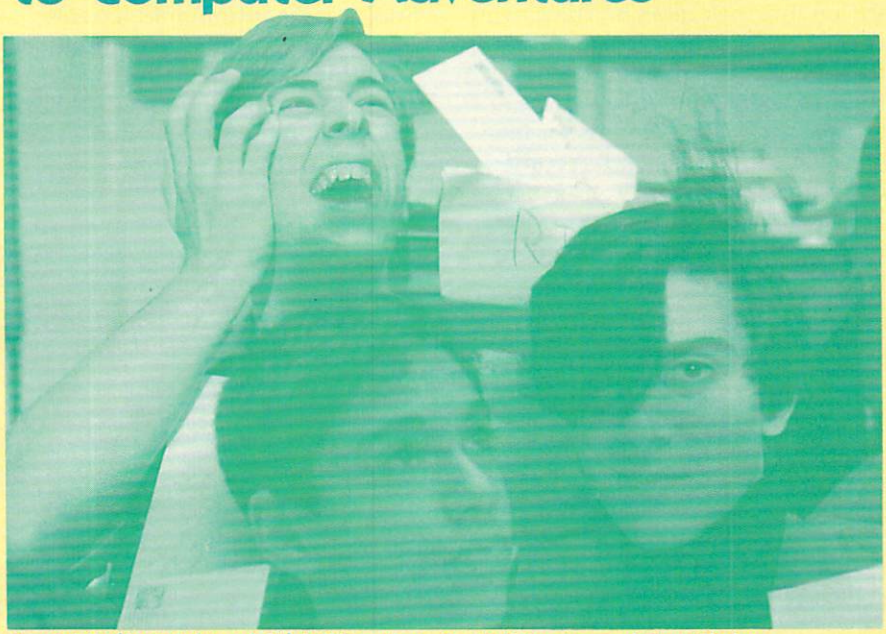
Edited by Bernadette Grey

K POWER

FOR THE COMPUTER GENERATION

Meet Rock Stars On-Line Page 56

The Special Ks' Survival Guide to Computer Adventures



Special Ks (from left to right) Jeff Donahue, Sasha Petraske, and Greg Shakar

In response to the growing number of readers who are being driven crazy by computer adventure games, we humbly offer the following list of items that well-equipped journeyers should take along to the terminal:

1. Dark Sunglasses. Reduce monitor glare and keep your identity a secret.

2. Soft Slippers. For sneaking around the house when playing in the wee hours of the morning.

3. A Year's Supply of Paper and Pencils. The lifeblood of the computer adventurer. Writing down hard-earned clues and making maps of uncharted areas can save a lot of sweat.

4. 168-Function Calculator. Can be used to figure out how many more experience points you need to advance a level or, better yet, to fool your parents into thinking these games are educational.

5. "I Love My Computer" T-Shirt. Let your computer know that you care.

6. Brown Paper Bag. To muffle loud screams of frustration when you realize your character has died and you forgot to save the game.

7. Documentation (and Toys). Keep everything handy that came with the game. Often valuable clues are hidden in the documentation. Without these, it is sometimes impossible to win the game. Also, any toys or props that come with the game are useful as bribes for younger siblings so that they will bring you food.

8. Radioactive Tracer Bracelet. In the unlikely event that a bug in the software sucks you into the computer, this item will help search parties determine the byte in which you are being held. —SPECIAL K JEFF DONAHUE

HOW I MADE A FORTUNE

Steven McElwee, a 15-year-old from Tower Hill, Illinois, won the "How to Make a Fortune" contest, which we announced in the December 1986 issue. Steven, who won $25, told us how he wrote a water-billing program and then sold it to his small town for $700.

This is what Steven wrote: "My mother came up with the great idea at the dinner table one evening. At first, I was a little scared. I didn't know much at that time about computers, let alone how to use one to write a program. But I went ahead, anyway.

"Within a few months, I was almost ready to present the program to the town board, but first I had to do the most critical part of the whole thing—make it fill in and send out prepared bills already made by a printing company. I received the cards for billing three days before the program was to be presented to the board. Since school was taking up so much of my time, I had to format and line up the bills the very same day I had to present the program to the board.

"I had three billing cards to try to work with. The first two cards were totally off, so then I had only one left—if I messed up this card, I could probably kiss a month's worth of work good-bye. Then the final card came through rather slowly—it seemed like forever. As I watched the perfect card eject, I just about passed out.

"I figured I would probably sell my program for $750 but, since the town was using it on an experimen-

(Continued on page 56)

Rock On-Line

Want to talk to Stacey Q.—live and in conference? Or find out when your favorite group is coming to rock your town? Thanks to disc jockey and sysop Les Tracy, you can. With a modem, you can tune into his nightly on-line rock 'n' roll forums—called RockNet on CompuServe Information Service and RockLink on QuantumLink.

The stars come on-line with Les and his fellow CJs—or computer jockeys—at 10 p.m. EST. Vicki Peterson of The Bangles, Lou Gramm (lead singer and drummer for Foreigner), Barry Manilow, and Allan "Undercover Angel" O'Day have all been guest artists. And Christine McVie of Fleetwood Mac will soon make a guest appearance.

Who is Les's audience, and what do the rock fans want to know? Some are musicians, record producers, and disc jockeys who want to talk to other insiders about the music business. For instance, when Barry Manilow was on-line, aspiring songwriters asked for, and received, advice on their work. But most conference participants are teen rock fans who want to know personal things about the guest artists. When Vicki Peterson (whose band made it big with "Walk Like an Egyptian" and "Manic Monday") was on, fans asked, "What kind of car do you drive?"

Besides getting more hot performers as guest stars, Les plans to keep the on-line rock news on the cutting edge of the music business. You will then be able to call up all the news there is about The Boss, get the scoop on the latest albums, or find out about the most recent record-company scandal.

Les talks about computing as if it were the greatest thing to happen to rock 'n' roll since the electric guitar. He prides himself on getting the scoop before the major rock magazines get their hands on it. "We'll report something like a member of Foreigner sprained his ankle on tour, and it'll appear a month later in *Rolling Stone*," says Les.

There's also a bulletin board and computer music to check out, plus fellow rock fans who are ready to chat about their favorite topic all day. To tune in, type GO ROCK (on CompuServe) and check "Just For Fun" (on QuantumLink). Les also loves to get E-Mail; his CompuServe I.D. number is 76703,1061. Or if you want to send him plain old mail, write to him at 8376 Lichen Drive, Citrus Heights, CA 95621.

—KATHRYN BONN

Put My Computer In the White House

ILLUSTRATION BY J. D. KING

The winner of our "Put My Computer in the White House" contest, mentioned in the February issue, is **Paul Colaianni**, 17, of Bristol, New Hampshire. These are some of the laws that his computer would make if it were assisting the President:

"The first and most important law is to have all computers created equal. If computers were created equal, no computer would be better or worse than another, and all the hardware and software manufacturers could produce the same amount of products for each of them.

"The second law is for the United States and Russia to extinguish all nuclear arms for a peaceful world for people and computer programmers.

"The third law is to give every family in the world $10,000. This would be achieved by cutting military spending."

MAIL US A MASTERPIECE

Jeff Preston, of Willoughby, Ohio, won $25 for creating this envelope for our "Mail Us a Masterpiece" contest (which was announced in the March issue).

How I Made a Fortune

(Continued from page 55)

tal basis, I sold it for $700 and free debugging. I am still debugging my program, and when it's in perfect running condition, I might start selling it to other towns.

"I appreciate the money, but the experience was the most important part of making and finishing the program. Anyone who has a computer should try programming in his or her spare time. In the long run, if you stick with it, you'll probably come out smiling with self-confidence."

STRATEGY

TIPS, TRICKS, AND HINTS

HOLLYWOOD HIJINX

Infocom. Text adventure. Your mission: Locate ten 'treasures' scattered around your deceased uncle's estate. If you succeed, you inherit your uncle's fortune. (*The hints and game are for Amiga, Apple II, Atari, Atari ST, C 64/128, IBM PC & compatibles, Macintosh.*)

If you're wondering what to do with the statue or how to get in the house, look on the back of Uncle Buddy's photo for some direction.

The business card in the mailbox can add colorful meaning to the punch cards.

To save time and prevent frustration, try the following instructions to the hedge maze (beginning at its entrance): N., W., N., W., N., W., S., W., W., N., W., S., E., S., E., N., E., S., W., N., W., S., W., N., W., S., W., N., E., N., E., N., E., E., N., E., S., E., E., S., E., N., E., S., W., S., W., S., E., N., W., S.

The fireplace holds more than one surprise.

The Atomic Chihuahua should save his fiery breath until you really need it.

Having trouble getting light in the bomb shelter? Wax is good for waterproofing.

Remember to remove the lens cap from the projector.

To open the safe in the hall, examine the wax statuettes closely. Uncle Buddy was very patriotic.

To open the safe in the bomb shelter, contemplate the plaque.

The rusty bucket can be used right where you found it.

Since the elevator is used so much, would it be surprising if something had fallen down the shaft?—SPECIAL K JEFF DONAHUE, *18, Bronx, New York*

HINT HOTLINE

KING'S QUEST I, Sierra On-Line (Amiga, Apple, Atari ST, IBM PC & compatibles, Macintosh). Text/graphic adventure. Your mission: Locate three precious treasures and become the King of Daventry.

To get the mirror, you must cut the rope in the well and get the bucket. Lower the rope. Climb down the rope. When you are in the water, take a dive. Swim into the hole to your left. There you will see a dragon guarding the mirror. See if you can 'wet' the dragon's appetite.—JEFF BARSKY, *Silver Spring, Maryland*

BRATACCAS, Mindscape (Amiga, Atari ST, Macintosh). Graphics adventure. Your mission: As Kyne, a fugitive scientist, you must explore the asteroid, Brataccas, to locate evidence that will prove your innocence.

Whenever you are in serious trouble with the law or other characters, go to the main menu and start the toggled movie mode. This should buy you some time. Simply turn the movie off when the coast is clear.—ERICK CID, *13, Richmond Hill, New York*

THE BARD'S TALE II, Electronic Arts (Apple, C 64/128). Text/graphic adventure. Your mission: Reunite the lost segments of the Destiny Wand to become the awesome Destiny Knight and defeat an ancient wizard.

Fanskar's Castle is located at 25 degrees North and 17 degrees East from the Sage's hut.

Only Archmages can equip segments of the Destiny Wand.

Always bring a Bard into a death snare. Spells wear out and cannot be recast, but Bard songs will work and provide light.

Seek the stone man in the wilderness. Tell him "KAZDEK".

Dargoth's Tower is located in Philipi.

Oscon's Fortress is in Corinth. —EVAN DICKINSON, *13, Charlottetown, P.E.I.,Canada*; TIM STACY, *14, Grundy, Virginia*

ROADWAR 2000, SSI (Apple II, 64/128). Strategy/Adventure. Your mission: Travel the savage roads of the future, looking for eight scientists who can find a cure for the plague.

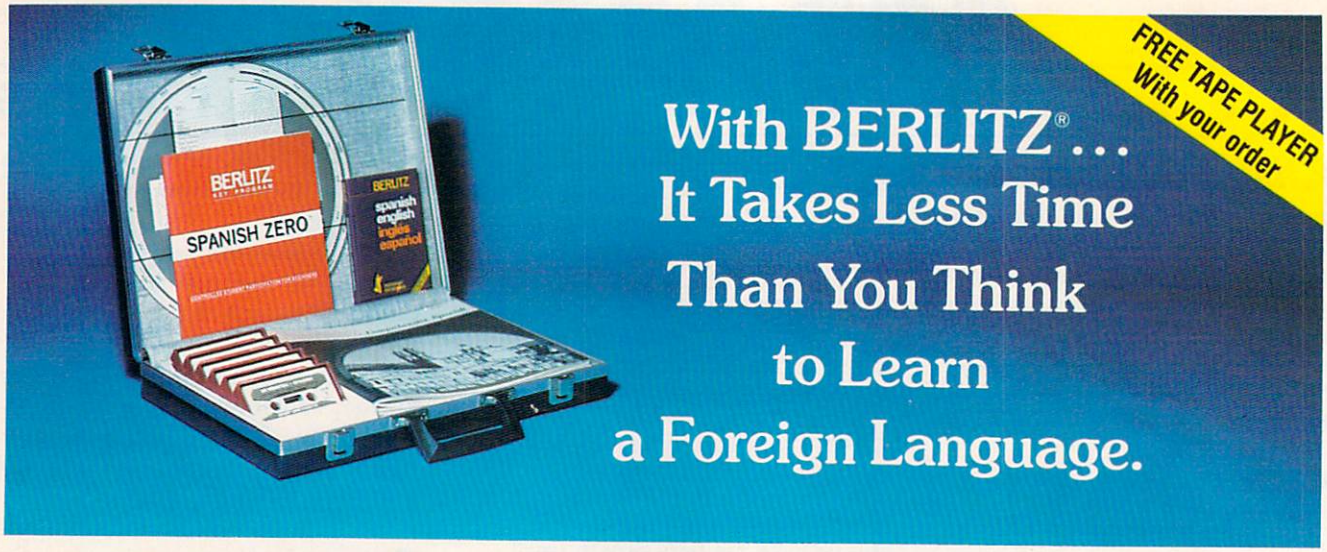
When first getting your gang together, try to get as many large vehicles as possible. Don't mess around with motorcycles and compact hardtops, for example. They aren't worth your time.

Before moving to another city, make sure that all your vehicles are in good shape, and you have at least 50 men and plenty of supplies.

Never fight abstract road combat with damaged vehicles; they are much more likely to crash.

Towns controlled by Lawful or Renegade National Guardsmen, Local Gangs, and Bureaucrats are the easiest to take over. Towns controlled by Survivalists, Satanists, and the Mob are more difficult to take over. Towns controlled by the Invaders are the hardest to take over.

San Jose has a pleasant surprise. —MIKE KING, *14, Burke, Virginia*



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the Programmer

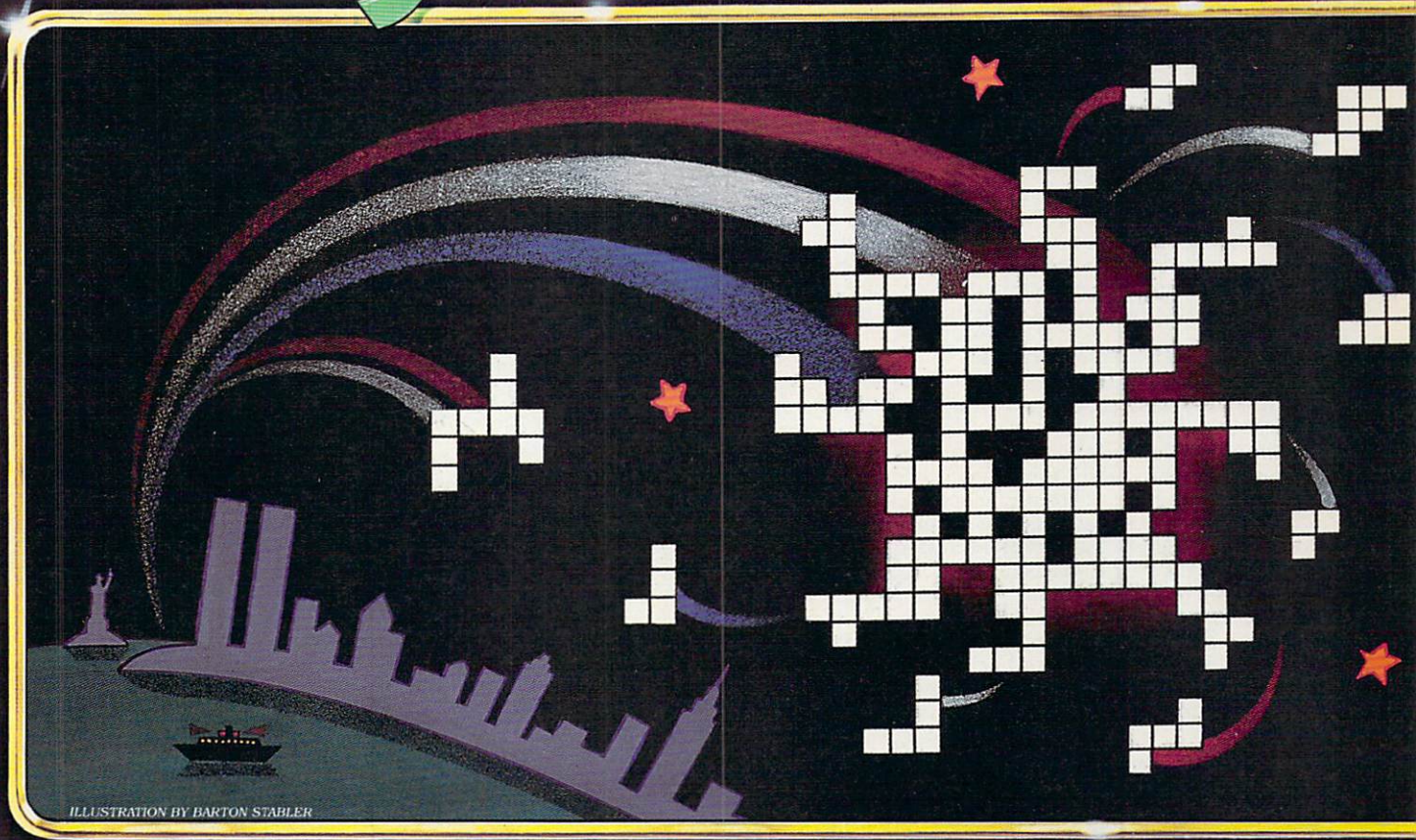

ILLUSTRATION BY BARTON STABLER

★ J U L Y ★

NEWS
Page 60
Read about our new machine coverage and program testing and the new FAMILY COMPUTING Program Status Line. Also, don't forget to check for corrections and debugging hints in Programming P.S. and Tips to the Typist.

HOME-HELPER PROGRAM
Page 62
Use *A/C Sizer* to help determine what size air conditioner you need to keep cool.

PUZZLE
Page 69
Look for Fourth of July words in this month's *Crossword Puzzler*, or design your own puzzle with any theme you like.

READER-WRITTEN PROGRAM
Page 75
Discover how a Maine minister learned to program an Apple IIc and get through a disabling illness; then, try his star-spangled program, *The Patriot*.

ILLUSTRATION BY JAMES CHERRY III

NEWS

NEW! EXPANDED COVERAGE OF POPULAR COMPUTERS
Programs Now Tested on More PC Compatibles; VIC-20, Model III/4 Programs Discontinued

You, our readers, often ask us for more programs in each issue, and for programs that are even more useful, games with more spectacular effects, productivity programs with more functions. Some of our best-received programs, such as *Home Information Manager* and *Maze Creator*, have also been among the longest, most feature-filled.

We'll be publishing more "meaty" programs, and sometimes more programs in an issue, for a wide range of computers: the Apple II series; the Atari 800/XL/XE series; the Commodore 64/64C/128/128D; the IBM PC, PC*jr*, PS/2 Model 30, and compatibles; and the Tandy Color Computer/2/3. We'll also continue to present programs for the Adam, Macintosh, and TI-99/4A. Occasionally, we'll publish special programs for one computer only (like *The Patriot* in this issue), or programming features that cover one particular computer system in depth.

GONE BUT NOT FORGOTTEN

To provide the space for this increased coverage, we have had to cease publishing programs for the Tandy Models III/4 (which have been overshadowed in Tandy's line by the spectacularly successful 1000 series and the Color Computer), and for the VIC-20. And as your needs evolve and the computers you own change, our coverage will continue to grow and change with you.

However, if you own any of these computers, you'll continue to find a wide variety of features of interest and use to you in every issue of FAMILY COMPUTING. Look for ideas, resources, and tips that can help you put your computer to better use and keep it operating efficiently. There will be more stories explaining how families like yours are using their computers to change their lives for the better. Special buyer's guides to computer systems and to IBM compatibles will assist you if you decide to buy a second (or third) computer, or to trade in for a new model. If you subscribe to CompuServe, watch the FAMILY COMPUTING Forum (GO FAMFORUM) for VIC-20 and Model III/4 programs published over the last four years that you may have missed.

And don't forget Machine Specifics; turn there every month to keep in touch with the latest developments in the Commodore and Tandy worlds.

NEW COVERAGE OF "CLONES"

Because of the explosive popularity of PC-compatible computers, we are now testing our IBM programs to see if they work the way they should on a number of the MS-DOS brands. These machines include Amstrad, Blue Chip, Commodore, Epson, Kaypro, Leading Edge, Panasonic, Tandy, and Zenith. Most of our IBM PC programs should run on "true" compatibles with no trouble, if you have the right system configuration (color graphics, for example). But now you can check to make sure a program will work flawlessly on your system *before* you type it in.

You can tell at a glance which programs will run on your computer, whether it's an Apple or an Amstrad, and where in the issue they can be found by checking "This Month's Program Coverage" chart that will appear in The Programmer each month. Any additional hardware/software requirements are listed there as well.

If you ever have a problem with a program, refer to "Tips to the Typist" in this section, or call our answering machine (*see box on page 62*) for program updates.

THE SYSTEMS WE TEST ON

Every FAMILY COMPUTING program is thoroughly tested before publication. The exact systems we use during the testing process are listed here. While you can be sure that a program will work if your system matches ours, a comparable system configuration should also work. For example, even though we do not test on the Franklin Ace, Apple programs should work on this system. Any exception to the following hardware/software configurations will be listed in the chart above. Systems that do not have a specific printer listed were tested with Epson FX-80 printers when a printer option was available.

ADAM w/80K RAM, Coleco SmartBASIC V1.0, disk enhanced by MMSG, Coleco disk drive, AdamDOS, and color monitor. **APPLE IIe** in 40-column mode w/64K RAM, DOS 3.3, two disk drives, MPC parallel printer interface, monochrome and color monitor. Apple programs should also work on Apple IIc/II+. **APPLE IIGS** w/1 MB RAM, one 3.5" and one 5.25" disk drive, ProDOS 3.3, and Apple RGB monitor. **ATARI 800XL** w/two disk drives, DOS II version 2.05, Atari 850 interface, and color monitor. Atari programs should also work on Atari 800(w/48K), 1200XL, 65/130XE. Smaller programs should work on Atari 400 & 600XL. **COMMODORE 128** in C 64 mode with two 1571 disk drives, color monitor, and Micrografix parallel graphics interface. Programs should also work on Commodore 64/64C/128D. **IBM PC** w/640K RAM, Disk BASIC D2.00, IBM Monochrome Display and Printer Adapter, monochrome monitor, IBM Color/Graphics Monitor Adapter, RGB monitor, AST Sixpack Plus, and IBM PC DOS 3.10. **IBM PC*jr*** w/128K RAM, one disk drive, IBM PC DOS 2.10, Cartridge BASIC J1.00. **IBM PS/2 Model 30** w/640K RAM, one floppy and one hard-disk drive, RGB monitor, IBM PC DOS 3.30, and IBM PC BASIC A3.30. **MACINTOSH** w/512K RAM, two disk drives, Microsoft BASIC 2.1, and ImageWriter printer. Macintosh programs should also work on 128K Mac/Mac Plus/SE/II, and under Microsoft BASIC 2.0. **TANDY COLOR COMPUTER 2** w/64K RAM, Disk Extended Color BASIC 1.1, two disk drives, Botek serial-to-parallel printer interface, color TV. It should also work on Color Computer 1 (w/64K) and 3. **TI-99/4A** with 8K RAM, peripheral expansion system, disk drive, TI parallel and serial printer interface, and TI-99/4A Impact Printer.

THIS MONTH'S PROGRAM COVERAGE

Computers*	A/C Sizer (pg 62)	Crossword Puzzler (pg 69)	The Patriot (pg 75)
Adam	★	F	
Apple IIgs	★	F	★ S
Apple II series	★	F	★
Atari 800/XL/XE	★	F	
Commodore 64/128	★	★ D p	
IBM PC FAMILY			
IBM PC	★	★ D p	
IBM PC*jr*	★	★ D p	
IBM PS/2 Model 30	★	★ D p	
IBM PC COMPATIBLES			
Blue Chip	★	★ D p	
Commodore PC 10	★	★ D p	
Epson Equity I	★	★ D p	
Kaypro PC 10	★	★ D p	
Leading Edge Model D	★	★ D p	
Panasonic FX600	★	★ D p	
Tandy 1000/EX/SX	★	★ D p	
Zenith Z148PC	★	★ D p	
Macintosh	★	F	
Tandy Color Computer	★	★ D p	
TI-99/4A	★		

KEY ★ Program written for this computer; D Disk drive required; F Version for this computer will appear in a future issue; p Printer optional; S Operate at normal speed; * See below for specific models

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* Mouse/joystick port	$59.95	No extra cost
* RGB color graphics port	$99.95	No extra cost
* Hercules compatible monochrome port	$79.95	No extra cost
MS DOS 3.2 & GW Basic	$199.00	$99.00
12" Hi-Res 35 MHz Green Screen Monitor (TTL & EGA compatible)	$249.00	$99.00
Monitor interface cable	$24.95	$19.95
Big Blue Printer	$199.00	$39.95
RS 232 IBM to Big Blue cable	$19.95	$9.95
2 rolls of heat transfer paper	$19.95	$5.95
Word First • Word Processor	$99.00	$39.95
Data First • Data Base	$99.00	$39.95
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The following IBM PC compatibles have been added to our testing list. IBM PC programs should also work on the other PC compatibles with at least 128K.

AMSTRAD w/640K RAM, two disk drives, MS-DOS 3.20, Locomotive BASIC, RGB monitor. **BLUE CHIP** w/512K RAM, two disk drives, monochrome monitor, MS-DOS 3.20, GW-BASIC 3.20. **COMMODORE PC 10** w/640K RAM, two disk drives, monochrome monitor, MS-DOS 3.20, GW-BASIC 3.20. **EPSON EQUITY I** w/256K RAM, two disk drives, monochrome display adapter, monochrome monitor, MS-DOS 3.10, GW-BASIC 3.10. **KAYPRO PC 10** w/640K RAM, two disk drives, RGB monitor, MS-DOS 2.11, GW-BASIC 2.02. **LEADING EDGE MODEL D** w/640K RAM, two disk drives, monochrome and RGB monitors, MS-DOS 3.10, GW-BASIC 3.11. **PANASONIC FX600** w/640K RAM, two disk drives MS-DOS 3.10, GW-BASIC 3.10, color/graphics adapter, RGB monitor. **TANDY 1000** w/256K RAM, two disk drives, MS-DOS 2.11 version 02.11.22, GW-BASIC 2.02 version 01.01.00, RGB monitor. **TANDY 1000 EX** w/384K RAM, two disk drives, MS-DOS 3.20 version 03.20.00, GW-BASIC 3.20 version 03.20.00, RGB monitor. **TANDY 1000 SX** w/256K RAM, two disk drives, MS-DOS 2.11 version 02.11.24, GW-BASIC 2.02 version 01.02.00, RGB monitor. **ZENITH Z148PC** w/640K RAM, two disk drives, MS-DOS 3.10, GW-BASIC 3.10, RGB monitor.

TIPS TO THE TYPIST

SOME GENERAL RULES

1. Read instructions and program headings carefully.

2. Don't let fatigue and boredom contribute to inaccuracy. If you're new to programming, type in a longer program in easy stages, SAVEing each installment as you go.

3. Assume that every character in a program listing must be copied accurately if a program is to work.

4. Watch out for potential trouble spots. About 90 percent of all typing errors occur in DATA statements.

5. Be aware that our program listings are printed 54 characters wide. Thus, a single BASIC program "line" (sometimes called a "logical line") may appear as several lines in our listing. If you are typing along and reach the right margin of the printed listing, don't press RETURN or ENTER before checking to see if the program "line" you're typing really ends there.

6. To correct an error in a BASIC program line, type the line in again from the beginning, and press RETURN or ENTER to replace the old line.

A HELP LINE FOR PROGRAM PROBLEMS (212) 505-3703

We have a new Program Status Line that you can call to receive an up-to-date summary of our latest programs, the machines they run on, and any corrections or enhancements to the programs.

Every program we publish is put through a rigorous testing process, and our goal each month is to give you only perfect programs. However, our programs must go through many phases of development in a very short time, and errors could creep in at any stage, despite our constant testing. We are distressed when this happens, because our hard work has gone to waste and because of all the trouble this causes you.

You can now call the Program Status Line, any time of day or night, for a quick report on the status of each program we've published in the last few months. That way, if there is an error in a program, we can tell you about it immediately and let you know when the correction will appear.

PROGRAMMING P.S.

Correction to a Previous Month's Program

On Top of Spaghetti *(May 1987, page 59)*

Adam: Line 2030 is missing from the published listing. The line should read as follows:

```
2030 DATA 682,1,644,1,682,1,766,1,859,9
```


HOW MUCH COOLING CAPACITY DO YOU NEED?

Use Our Program and Don't Get Left Out in the Heat

BY PASQUALE M. CIRULLO

ILLUSTRATION BY JOSH COSFIELD

The temperature outside has soared past 90 degrees. The humidity is 85 percent. Your air conditioner is running full blast. As the sweat rolls down your brow, your dog looks at you with her big eyes as if to say, "Why is it so hot in here?" The air conditioner just isn't doing its job. Why?

Probably your air conditioner doesn't have enough capacity. A room air conditioner's cooling capacity is measured in British Thermal Units or BTUs. The higher the capacity, the more work an air conditioner can do. Determining the capacity you need can be a little tricky because it depends on many different factors, including the types of windows you have, your walls, roof or ceiling, and floor, and, of course, the climate where you live.

To assist you in choosing the air conditioner that's right for the space you want to cool, type in *A/C Sizer*, SAVE, and RUN it. When you RUN the program, you will be asked a series of questions relating to the room you want to cool. Answer yes-or-no questions by pressing Y or N (you need not press RETURN or ENTER). When you are asked for a number or two, type the number (if there are two, seperate them with commas) and press RETURN. For example, when asked , "What are the width and height of window #1 in inches?," you might type "24,52" and press RETURN.

You might want to jot down a few measurements (all measurements are in feet except for the windows which should be measured in inches) and other specifics about the room before you RUN the program.

Here is a breakdown of what the computer will ask you and what you need to know.

1. Will the air conditioner be used only at night? If the air conditioner is used only between sunset and sunrise, it does not have to be as large as it would if it were used during the day, and you should answer Y.

2. Windows: The computer will ask you for the number of windows that face in each of the following directions: northeast, east, southeast, south, southwest, west, and northwest. If you have windows facing in a particular direction, the computer will then ask you for the width and height of each window in inches. Also of importance is whether the windows are covered by shades or outside awnings and whether the windows are glass blocks, are double pane, or have storm windows.

If you answered Y to question #1, the computers will only ask how many windows are single pane and how many are double

pane. If a window is either glass block or has storm windows, consider it a double pane window. You will also be asked for the dimensions of these windows in inches.

3. Walls: The computer will ask if the outside walls are of light construction. If the walls exposed to the outside are either uninsulated frame walls or masonry walls 8 inches or less in thickness, answer Y to this question. If the walls are insulated frame walls or masonry walls over 8 inches in thickness, answer N. The program also needs to know the total length of the room's exterior walls, the length of those exterior walls that face north, and the total length of its interior walls. For exterior walls, consider a wall that is shaded by a permanent structure, such as another building, to be facing North. Trees and shrubbery are not considered to be permanent structures. For interior walls, do not include walls between two air-conditioned rooms, only walls between an air-conditioned room and a non-air-conditioned room. Doors should be considered as being part of the wall.

4. Roof or Ceiling: You will be asked for the length and width of the ceiling. You will also be asked a series of yes or no questions about your ceiling. If your building has an attic, answer N when asked if the roof is directly overhead. You will then be asked if your roof or ceiling is insulated.

5. Floor: If your space is directly on the ground or above the basement, the heat gain from the floor does not count in determining the size of the air conditioner.

6. Doors and Arches: The computer will ask for the total width, in feet, of all doors and arches between the air-conditioned space and any non-air conditioned space. If the total width is larger than five feet, the two spaces should be considered as one room. Otherwise, the calculation will be inaccurate.

7. Map Factor: Locate where you live on the map (*see map*) and enter the number that appears in that zone. For example, if you live near Phoenix, Arizona enter 1.5. If you live near Portland, Maine enter 0.7.

8. People: Enter the number of people that normally occupy the space.

9. Lights and Electrical Equipment: Enter the total number of watts for lights and other electrical equipment, except the air conditioner, that will be used when the air conditioner is used. Include such items as the lights, stereo equipment, and TV sets.

After you have answered the final question, you will be presented with a list of the sources of heat in the room and how much heat is gained from each item. The final line on the screen, Total Cooling Load, is the air-conditioner capacity you will need to cool the room.

BEST RESULTS

For best results, choose an air conditioner that is close to the capacity determined by *A/C Sizer*. If you have to choose between an air conditioner with a higher and one with a lower capacity than called for by the program, choose the air conditioner with the smaller size. In general, an undersized unit that operates nearly continuously is more satisfactory than an oversized unit that runs intermittently.

When purchasing your air conditioner, also look for the EER (Energy Efficiency Rating) of the unit. The higher the EER, the more efficient the unit is. The EER can be found on the bright yellow "EnergyGuide" labels that are on all room air conditioners. The labels will show the unit's cooling capacity (in BTU/hr), its EER, and how that unit compares in efficiency to other models of the same capacity.

EDITOR'S NOTE: *Technical assistance for this program was supplied by the Association of Home Appliance Manufactures. For more information on air conditioners and other home appliances, contact The Association of Home Appliance Manufacturers, 20 North Wacker Drive, Chicago, Illinois 60606.*

MAP FACTORS

Adam & Apple II series/*A/C Sizer*

```
10 DIM CF(9,2),DL(8),F(8,3),HG(9),Q(9)
20 DIM D$(8),H$(9),L$(9)
30 FOR X = 1 TO 8:READ D$(X):NEXT X
40 FOR X = 1 TO 9:READ H$(X):NEXT X
50 FOR X = 1 TO 9:READ L$(X):NEXT X
60 FOR X = 6 TO 8:L$(X) = "":NEXT X
70 FOR X = 1 TO 9:READ CF(X,1),CF(X,2):NEXT X
80 FOR X = 1 TO 8:FOR Y = 1 TO 3:READ F(X,Y):NEXT Y,X
90 DS$ = CHR$(45):FOR X = 2 TO 30:DS$ = DS$+CHR$(45)
100 NEXT X:HOME:PRINT TAB(11);"A/C SIZER":PRINT
110 PRINT "WILL THE AIR CONDITIONER BE"
120 PRINT "USED ONLY AT NIGHT? ";:GOSUB 2000
130 PRINT Z$:IF Z$ = "Y" THEN T = 1:HG(1) = 0:GOTO 390
140 T = 2:SP = 0:DP = 0:FOR X = 1 TO 8:C = 1:WT = 1
150 HOME:PRINT TAB(12);H$(1):PRINT
160 PRINT "HOW MANY WINDOWS FACE":PRINT D$(X);
170 INPUT N:IF N < 0 THEN 150
180 IF N = 0 THEN DL(X) = 0:GOTO 350
190 GOSUB 3000:PRINT
200 PRINT "ARE THESE WINDOWS COVERED BY"
210 PRINT "SHADES? ";:GOSUB 2000:PRINT Z$
220 IF Z$ = "Y" THEN C = 2:GOTO 260
230 PRINT:PRINT "ARE THESE WINDOWS COVERED BY"
240 PRINT "OUTSIDE AWNINGS? ";:GOSUB 2000:PRINT Z$
250 IF Z$ = "Y" THEN C = 3
260 PRINT:PRINT "ARE THE WINDOWS GLASS BLOCKS? ";
270 GOSUB 2000:PRINT Z$
280 IF Z$ = "Y" THEN WT = 0.5:DP = DP+SF:GOTO 340
290 PRINT:PRINT "ARE THE WINDOWS DOUBLE GLASS OR"
300 PRINT "DO THEY HAVE STORM WINDOWS? ";:GOSUB 2000
310 PRINT Z$
320 IF Z$ = "Y" THEN WT = 0.8:DP = DP+SF:GOTO 340
330 SP = SP+SF
340 DL(X) = SF*WT*F(X,C)
350 NEXT X:HG(1) = DL(1)
360 FOR X = 2 TO 7:IF DL(X) > HG(1) THEN HG(1) = DL(X)
370 NEXT X:HG(1) = HG(1)+DP*7+SP*14
380 Q(1) = SP+DP:GOTO 480
390 HOME:PRINT TAB(12);H$(1):PRINT
400 PRINT "HOW MANY WINDOWS ARE SINGLE"
410 INPUT "GLASS? ";N:IF N < 0 THEN 390
420 IF N = 0 THEN 440
430 GOSUB 3000:HG(1) = HG(1)+SF*14:Q(1) = SF
440 PRINT:PRINT "HOW MANY WINDOWS ARE DOUBLE"
```

```
450 INPUT "GLASS OR GLASS BLOCK? ";N:IF N < 0 THEN 440
460 IF N = 0 THEN 480
470 GOSUB 3000:HG(1) = HG(1)+SF*7:Q(1) = Q(1)+SF
480 HOME:PRINT TAB(13);H$(2)
490 PRINT:PRINT "ARE THE OUTSIDE WALLS OF LIGHT"
500 PRINT "CONSTRUCTION? ";:GOSUB 2000:PRINT Z$
510 IF Z$ = "Y" THEN CF(1,2) = 30:CF(2,2) = 60
520 PRINT:PRINT "WHAT IS THE TOTAL LENGTH OF THE"
530 INPUT "ROOM'S EXTERIOR WALLS? ";TL
540 IF TL < 0 THEN 520
550 HG(2) = TL*CF(2,T)
560 PRINT:PRINT "WHAT IS THE LENGTH OF EXTERIOR"
570 INPUT "WALLS FACING NORTH? ";L:IF L < 0 THEN 560
580 HG(2) = HG(2)+L*(CF(1,T)-CF(2,T))
590 PRINT:PRINT "WHAT IS THE TOTAL LENGTH OF"
600 INPUT "INTERIOR WALLS? ";LI:IF LI < 0 THEN 590
610 HG(2) = HG(2)+LI*CF(3,T):Q(2) = TL+LI
620 HOME:PRINT TAB(12);H$(3):A = 4:B = 0
630 PRINT:PRINT "WHAT ARE THE LENGTH AND WIDTH"
640 INPUT "OF THE CEILING? ";L,W
650 IF L < 0 OR W < 0 THEN 620
660 Q(3) = L*W:Q(4) = Q(3)
670 PRINT:PRINT "IS THE ROOF DIRECTLY"
680 PRINT "OVERHEAD? ";:GOSUB 2000:PRINT Z$
690 IF Z$ = "Y" THEN A = 1:A$ = "ROOF":GOTO 730
700 A$ = "CEILING":PRINT:PRINT "IS THE ATTIC DIRECTLY"
710 PRINT "OVERHEAD? ";:GOSUB 2000:PRINT Z$
720 IF Z$ = "N" THEN A = 3:GOTO 750
730 PRINT:PRINT "IS THE ";A$;" INSULATED? ";
740 GOSUB 2000:PRINT Z$:IF Z$ = "Y" THEN B = 1
750 R = A+B:HG(3) = Q(3)*CF(3+R,T)
760 HOME:PRINT TAB(13);H$(4)
770 PRINT:PRINT "IS THERE AN OCCUPIED SPACE"
780 PRINT "BELOW YOU? ";:GOSUB 2000
790 PRINT Z$:IF Z$ = "N" THEN HG(4) = 0:GOTO 810
800 HG(4) = 3*Q(4)
810 HOME:PRINT TAB(13);H$(5)
820 PRINT:PRINT "WHAT IS THE WIDTH OF DOORS"
830 PRINT "AND ARCHES CONTINUOUSLY OPEN"
840 INPUT "TO UNCONDITIONED SPACE? ";Q(5)
850 IF Q(5) < 0 THEN 810
860 HG(5) = Q(5)*CF(9,T):HG(6) = 0
870 FOR X = 1 TO 5:HG(6) = HG(6)+HG(X):NEXT X
880 HOME:PRINT TAB(11);H$(7)
890 PRINT:PRINT "WHAT IS THE MAP FACTOR"
900 INPUT "(SEE FIGURE #1)? ";Q(7)
910 IF Q(7) < 0.7 OR Q(7) > 1.5 THEN 880
920 HG(7) = HG(6)*Q(7)
930 HOME:PRINT TAB(13);H$(8)
940 PRINT:PRINT "HOW MANY PEOPLE WILL USE THE"
950 INPUT "SPACE ON A CONTINUOUS BASIS? ";Q(8)
960 IF Q(8) < 0 THEN 930
970 HG(8) = Q(8)*600
980 HOME:PRINT TAB(13);H$(9)
990 PRINT:PRINT "WHAT IS THE TOTAL WATTAGE OF"
1000 PRINT "ELECTRICAL EQUIPMENT USED IN"
1010 INPUT "THE SPACE TO BE COOLED? ";Q(9)
1020 IF Q(9) < 0 THEN 980
1030 HG(9) = Q(9)*3:BTU = INT(HG(7)+HG(8)+HG(9))
1040 HOME:PRINT TAB(6);"HEAT GAIN BY SOURCE"
1050 PRINT:PRINT TAB(24);"BTU/HR"
1060 PRINT TAB(24);"------":FOR X = 1 TO 9
1070 Q$ = STR$(INT(Q(X))):HG$ = STR$(INT(HG(X)))
1080 IF X = 7 THEN Q$ = STR$(Q(7))
1090 IF X = 6 THEN 1140
1100 E = 15-LEN(H$(X))-LEN(Q$)
1110 G = 13-LEN(L$(X))-LEN(HG$)
1120 PRINT H$(X);SPC(E);Q$;" ";L$(X);SPC(G);HG$
1130 GOTO 1150
1140 PRINT:PRINT H$(6);SPC(21-LEN(HG$));HG$:PRINT DS$
1150 NEXT X:PRINT:PRINT "TOTAL COOLING LOAD";
1160 BT$ = STR$(BTU):E = 11-LEN(BT$):PRINT SPC(E);BT$
1170 PRINT:END
2000 GET Z$:Z = ASC(Z$)
2010 Z$ = CHR$(Z-32*(Z > 96)*(Z < 123))
2020 IF Z$ <> "Y" AND Z$ <> "N" THEN 2000
2030 RETURN
3000 SF = 0:FOR Y = 1 TO N
3010 PRINT:PRINT "WHAT ARE THE WIDTH AND HEIGHT"
3020 PRINT "OF WINDOW #";Y;:INPUT " IN INCHES? ";W,H
3030 IF W < 0 OR H < 0 THEN 3010
3040 SF = SF+((W*H)/144):NEXT Y:RETURN
4000 DATA NORTHEAST,EAST,SOUTHEAST,SOUTH,SOUTHWEST
4010 DATA WEST,NORTHWEST,NORTH,WINDOWS,WALLS,CEILING
4020 DATA FLOOR,DOORS,SUBTOTAL,MAP FACTOR,PEOPLE
4030 DATA LIGHTS,SQFT,FT,SQFT,SQFT,FT,FT,FT,FT,W
4040 DATA 20,20,20,30,30,30,5,19,3,8,3,3,7,12,4,5,200
4050 DATA 300,60,25,20,80,40,25,75,30,20,75,35,20,110
4060 DATA 45,30,150,65,45,120,50,35,0,0,0
```

Atari 800/XL/XE/A/C Sizer

```
10 DIM CF(9,2),DL(8),DP(9),F(8,3),HG(9),HP(10),LP(10)
20 DIM Q(9),A$(20),BT$(10),CL$(1),D$(100),DA$(32)
30 DIM H$(100),HG$(20),L$(100),Q$(3),S$(25),SP$(1)
40 DIM T$(20),Z$(1):POKE 82,0:OPEN #1,4,0,"K:"
50 CL$=CHR$(125):SP$=CHR$(32)
60 DA$(1)="-":DA$(32)="-":DA$(2)=DA$
70 S$(1)=SP$:S$(25)=SP$:S$(2)=S$
80 FOR X=1 TO 8:DP(X)=LEN(D$)+1:READ T$
90 D$(DP(X))=T$:NEXT X:DP(9)=LEN(D$)+1
100 FOR X=1 TO 9:HP(X)=LEN(H$)+1:READ T$
110 H$(HP(X))=T$:NEXT X:HP(10)=LEN(H$)+1
120 FOR X=1 TO 9:LP(X)=LEN(L$)+1:READ T$
130 L$(LP(X))=T$:NEXT X:LP(10)=LEN(L$)+1
140 FOR X=17 TO 19:L$(X,X)=SP$:NEXT X
150 FOR X=1 TO 9:READ A,B:CF(X,1)=A:CF(X,2)=B:NEXT X
160 FOR X=1 TO 8:FOR Y=1 TO 3:READ T
170 F(X,Y)=T:NEXT Y:NEXT X
180 PRINT CL$;S$(1,11);"A/C SIZER":PRINT
190 PRINT "WILL THE AIR CONDITIONER BE USED ONLY"
200 PRINT "AT NIGHT? ";:GOSUB 2000
210 PRINT Z$:IF Z$="Y" THEN T=1:HG(1)=0:GOTO 440
220 T=2:SP=0:DP=0:FOR X=1 TO 8:C=1:WT=1
230 PRINT CL$;S$(1,12);"WINDOWS":PRINT
240 PRINT "HOW MANY WINDOWS FACE ";
250 PRINT D$(DP(X),DP(X+1)-1);:INPUT N:IF N<0 THEN 230
260 IF N=0 THEN DL(X)=0:GOTO 410
270 GOSUB 3000:PRINT
280 PRINT "ARE THESE WINDOWS COVERED BY SHADES? ";
290 GOSUB 2000:PRINT Z$:IF Z$="Y" THEN C=2:GOTO 330
300 PRINT :PRINT "ARE THESE WINDOWS COVERED BY"
310 PRINT "OUTSIDE AWNINGS? ";:GOSUB 2000:PRINT Z$
320 IF Z$="Y" THEN C=3
330 PRINT :PRINT "ARE THE WINDOWS GLASS BLOCKS? ";
340 GOSUB 2000:PRINT Z$
350 IF Z$="Y" THEN WT=0.5:DP=DP+SF:GOTO 400
360 PRINT :PRINT "ARE THE WINDOWS DOUBLE GLASS OR"
370 PRINT "DO THEY HAVE STORM WINDOWS? ";:GOSUB 2000
380 PRINT Z$:IF Z$="Y" THEN WT=0.8:DP=DP+SF:GOTO 400
390 SP=SP+SF
400 DL(X)=SF*WT*F(X,C)
410 NEXT X:HG(1)=DL(1)
420 FOR X=2 TO 7:IF DL(X)>HG(1) THEN HG(1)=DL(X)
430 NEXT X:HG(1)=DP*7+SP*14:Q(1)=SP+DP:GOTO 530
440 PRINT CL$;S$(1,12);"WINDOWS":PRINT
450 PRINT "HOW MANY WINDOWS ARE SINGLE GLASS";
460 INPUT N:IF N<0 THEN 440
470 IF N=0 THEN 490
480 GOSUB 3000:HG(1)=HG(1)+SF*14:Q(1)=SF
490 PRINT :PRINT "HOW MANY WINDOWS ARE DOUBLE GLASS"
500 PRINT "OR GLASS BLOCK";:INPUT N:IF N<0 THEN 490
510 IF N=0 THEN PRINT :GOTO 530
520 GOSUB 3000:HG(1)=HG(1)+SF*7:Q(1)=Q(1)+SF
530 PRINT CL$;S$(1,13);"WALLS"
540 PRINT :PRINT "ARE THE OUTSIDE WALLS OF LIGHT"
550 PRINT "CONSTRUCTION? ";:GOSUB 2000:PRINT Z$
```

```
560 IF Z$="Y" THEN CF(1,2)=30:CF(2,2)=60
570 PRINT :PRINT "WHAT IS THE TOTAL LENGTH OF THE"
580 PRINT "ROOM'S EXTERIOR WALLS";:INPUT TL
590 IF TL<0 THEN 570
600 HG(2)=TL*CF(2,T)
610 PRINT :PRINT "WHAT IS THE LENGTH OF EXTERIOR"
620 PRINT "WALLS FACING NORTH";:INPUT L
630 IF L<0 THEN 610
640 HG(2)=HG(2)+L*(CF(1,T)-CF(2,T))
650 PRINT :PRINT "WHAT IS THE TOTAL LENGTH OF"
660 PRINT "INTERIOR WALLS";:INPUT LI:IF LI<0 THEN 650
670 HG(2)=HG(2)+LI*CF(3,T):Q(2)=TL+LI
680 PRINT CL$;S$(1,12);"CEILING":A=4:B=0
690 PRINT :PRINT "WHAT ARE THE LENGTH AND WIDTH OF"
700 PRINT "THE CEILING";:INPUT L,W
710 IF L<0 OR W<0 THEN 680
720 Q(3)=L*W:Q(4)=Q(3)
730 PRINT :PRINT "IS THE ROOF DIRECTLY OVERHEAD? ";
740 GOSUB 2000:PRINT Z$
750 IF Z$="Y" THEN A=1:A$="ROOF":GOTO 800
760 A$="CEILING":PRINT
770 PRINT "IS THE ATTIC DIRECTLY OVERHEAD? ";
780 GOSUB 2000:PRINT Z$
790 IF Z$="N" THEN A=3:GOTO 820
800 PRINT :PRINT "IS THE ";A$;" INSULATED? ";
810 GOSUB 2000:PRINT Z$:IF Z$="Y" THEN B=1
820 R=A+B:HG(3)=Q(3)*CF(3+R,T)
830 PRINT CL$;S$(1,13);"FLOOR":PRINT
840 PRINT "IS THERE AN OCCUPIED SPACE BELOW YOU? ";
850 GOSUB 2000:PRINT Z$
860 IF Z$="N" THEN HG(4)=0:GOTO 880
870 HG(4)=3*Q(4)
880 PRINT CL$;S$(1,13);"DOORS":PRINT
890 PRINT "WHAT IS THE WIDTH OF DOORS AND ARCHES"
900 PRINT "CONTINUOUSLY OPEN TO UNCONDITIONED"
910 PRINT "SPACE";:INPUT N:IF N<0 THEN 880
920 Q(5)=N:HG(5)=Q(5)*CF(9,T)
930 HG(6)=0:FOR X=1 TO 5:HG(6)=HG(6)+HG(X):NEXT X
940 PRINT CL$;S$(1,11);"MAP FACTOR"
950 PRINT :PRINT "WHAT IS THE MAP FACTOR"
960 PRINT "(SEE FIGURE #1)";:INPUT T
970 Q(7)=T:IF Q(7)<0.7 OR Q(7)>1.5 THEN 940
980 HG(7)=HG(6)*Q(7)
990 PRINT CL$;S$(1,13);"PEOPLE":PRINT
1000 PRINT "HOW MANY PEOPLE WILL USE THE SPACE ON A"
1010 PRINT "CONTINUOUS BASIS";:INPUT T:Q(8)=T
1020 IF Q(8)<0 THEN 990
1030 HG(8)=Q(8)*600
1040 PRINT CL$;S$(1,13);"LIGHT":PRINT
1050 PRINT "WHAT IS THE TOTAL WATTAGE OF ELECTRICAL"
1060 PRINT "EQUIPMENT USED IN THE SPACE TO BE"
1070 PRINT "COOLED";:INPUT T:IF T<0 THEN 1040
1080 Q(9)=T:HG(9)=Q(9)*3:BTU=INT(HG(7)+HG(8)+HG(9))
1090 PRINT CL$;S$(1,6);"HEAT GAIN BY SOURCE"
1100 PRINT :PRINT S$(1,23);"BTU/HR"
1110 PRINT S$(1,23);"------":FOR X=1 TO 9
1120 Q$=STR$(INT(Q(X))):HG$=STR$(INT(HG(X)))
1130 IF X=7 THEN Q$=STR$(Q(X))
1140 IF X=6 THEN 1190
1150 E=15-HP(X+1)+HP(X)-LEN(Q$)
1160 G=13-LP(X+1)+(LP(X)-LEN(HG$))
1170 PRINT H$(HP(X),HP(X+1)-1);S$(1,E);Q$;SP$;L$(LP(X)
,LP(X+1)-1);S$(1,G);HG$
1180 GOTO 1210
1190 E=21-LEN(HG$):PRINT :PRINT "SUBTOTAL";S$(1,E);HG$
1200 PRINT DA$
1210 NEXT X:PRINT :PRINT "TOTAL COOLING LOAD";
1220 BT$=STR$(BTU):E=11-LEN(BT$):PRINT S$(1,E);BT$
1230 PRINT :END
2000 GET #1,Z:Z$=CHR$(Z-32*(Z>96)*(Z<123))
2010 IF Z$<>"Y" AND Z$<>"N" THEN 2000
2020 RETURN
3000 SF=0:FOR Y=1 TO N
3010 PRINT :PRINT "WHAT ARE THE WIDTH AND HEIGHT OF"
3020 PRINT "WINDOW #";Y;" IN INCHES";:INPUT W,H
3030 IF W<0 OR H<0 THEN 3010
3040 SF=SF+W*H/144:NEXT Y:RETURN
```

After you have typed in the above lines, add the DATA statements (lines 4000–4060) from the Adam/Apple II version.

Commodore 64 & 128 (C 64 mode)/*A/C Sizer*

```
10 DIM CF(9,2),DL(8),F(8,3),HG(9),Q(9)
20 DIM D$(8),H$(9),L$(9)
30 FOR X=1 TO 8:READ D$(X):NEXT X
40 FOR X=1 TO 9:READ H$(X):NEXT X
50 FOR X=1 TO 9:READ L$(X):NEXT X
60 FOR X=6 TO 8:L$(X)="":NEXT X
70 FOR X=1 TO 9:READ CF(X,1),CF(X,2):NEXT X
80 FOR X=1 TO 8:FOR Y=1 TO 3:READ F(X,Y):NEXT Y,X
90 DS$=CHR$(45):FOR X=2 TO 32:DS$=DS$+CHR$(45):NEXT X
100 PRINT CHR$(147);:PRINT TAB(11);"A/C SIZER":PRINT
110 PRINT "WILL THE AIR CONDITIONER BE"
120 PRINT "USED ONLY AT NIGHT? ";:GOSUB 2000
130 PRINT Z$:IF Z$="Y" THEN T=1:HG(1)=0:GOTO 370
140 T=2:SP=0:DP=0:FOR X=1 TO 8:C=1:WT=1
150 PRINT CHR$(147);:PRINT TAB(12);H$(1):PRINT
160 PRINT "HOW MANY WINDOWS FACE":PRINT D$(X);
170 INPUT N:IF N<0 THEN 150
180 IF N=0 THEN DL(X)=0:GOTO 340
190 GOSUB 3000:PRINT
200 PRINT "ARE THESE WINDOWS COVERED BY"
210 PRINT "SHADES? ";:GOSUB 2000:PRINT Z$
220 IF Z$="Y" THEN C=2:GOTO 260
230 PRINT:PRINT "ARE THESE WINDOWS COVERED BY"
240 PRINT "OUTSIDE AWNINGS? ";:GOSUB 2000:PRINT Z$
250 IF Z$="Y" THEN C=3
260 PRINT:PRINT "ARE THE WINDOWS GLASS BLOCKS? ";
270 GOSUB 2000:PRINT Z$
280 IF Z$="Y" THEN WT=.5:DP=DP+SF:GOTO 330
290 PRINT:PRINT "ARE THE WINDOWS DOUBLE GLASS OR"
300 PRINT "DO THEY HAVE STORM WINDOWS? ";:GOSUB 2000
310 PRINT Z$:IF Z$="Y" THEN WT=.8:DP=DP+SF:GOTO 330
320 SP=SP+SF
330 DL(X)=SF*WT*F(X,C)
340 NEXT X:HG(1)=DL(1)
350 FOR X=2 TO 7:IF DL(X)>HG(1) THEN HG(1)=DL(X)
360 NEXT X:HG(1)=HG(1)+DP*7+SP*14:Q(1)=SP+DP:GOTO 460
370 PRINT CHR$(147);:PRINT TAB(12);H$(1):PRINT
380 PRINT "HOW MANY WINDOWS ARE SINGLE"
390 INPUT "GLASS";N:IF N<0 THEN 370
400 IF N=0 THEN 420
410 GOSUB 3000:HG(1)=HG(1)+SF*14:Q(1)=SF
420 PRINT:PRINT "HOW MANY WINDOWS ARE DOUBLE"
430 INPUT "GLASS OR GLASS BLOCK";N:IF N<0 THEN 420
440 IF N=0 THEN 460
450 GOSUB 3000:HG(1)=HG(1)+SF*7:Q(1)=Q(1)+SF
460 PRINT CHR$(147);:PRINT TAB(13);H$(2)
470 PRINT:PRINT "ARE THE OUTSIDE WALLS OF LIGHT"
480 PRINT "CONSTRUCTION? ";:GOSUB 2000:PRINT Z$
490 IF Z$="Y" THEN CF(1,2)=30:CF(2,2)=60
500 PRINT:PRINT "WHAT IS THE TOTAL LENGTH OF THE"
510 INPUT "ROOM'S EXTERIOR WALLS";TL:IF TL<0 THEN 500
520 HG(2)=TL*CF(2,T)
530 PRINT:PRINT "WHAT IS THE LENGTH OF EXTERIOR"
540 INPUT "WALLS FACING NORTH";L:IF L<0 THEN 530
550 HG(2)=HG(2)+L*(CF(1,T)-CF(2,T))
560 PRINT:PRINT "WHAT IS THE TOTAL LENGTH OF"
570 INPUT "INTERIOR WALLS";LI:IF LI<0 THEN 560
580 HG(2)=HG(2)+LI*CF(3,T):Q(2)=TL+LI
590 PRINT CHR$(147);:PRINT TAB(12);H$(3):A=4:B=0
600 PRINT:PRINT "WHAT ARE THE LENGTH AND WIDTH"
610 INPUT "OF THE CEILING";L,W:IF L<0 OR W<0 THEN 590
620 Q(3)=L*W:Q(4)=Q(3)
630 PRINT:PRINT "IS THE ROOF DIRECTLY"
```

```
640 PRINT "OVERHEAD? ";:GOSUB 2000:PRINT Z$
650 IF Z$="Y" THEN A=1:A$="ROOF":GOTO 690
660 A$="CEILING":PRINT:PRINT "IS THE ATTIC DIRECTLY"
670 PRINT "OVERHEAD? ";:GOSUB 2000:PRINT Z$
680 IF Z$="N" THEN A=3:GOTO 710
690 PRINT:PRINT "IS THE ";A$;" INSULATED? ";
700 GOSUB 2000:PRINT Z$:IF Z$="Y" THEN B=1
710 R=A+B:HG(3)=Q(3)*CF(3+R,T)
720 PRINT CHR$(147);:PRINT TAB(13);H$(4)
730 PRINT:PRINT "IS THERE AN OCCUPIED SPACE"
740 PRINT "BELOW YOU? ";:GOSUB 2000
750 PRINT Z$:IF Z$="N" THEN HG(4)=0:GOTO 770
760 HG(4)=3*Q(4)
770 PRINT CHR$(147);:PRINT TAB(13);H$(5)
780 PRINT:PRINT "WHAT IS THE WIDTH OF DOORS"
790 PRINT "AND ARCHES CONTINUOUSLY OPEN"
800 INPUT "TO UNCONDITIONED SPACE";Q(5)
810 IF Q(5)<0 THEN 770
820 HG(5)=Q(5)*CF(9,T)
830 HG(6)=0:FOR X=1 TO 5:HG(6)=HG(6)+HG(X):NEXT X
840 PRINT CHR$(147);:PRINT TAB(11);H$(7)
850 PRINT:PRINT "WHAT IS THE MAP FACTOR"
860 INPUT "(SEE FIGURE #1)";Q(7)
870 IF Q(7)<0.7 OR Q(7)>1.5 THEN 840
880 HG(7)=HG(6)*Q(7)
890 PRINT CHR$(147);:PRINT TAB(13);H$(8)
900 PRINT:PRINT "HOW MANY PEOPLE WILL USE THE"
910 INPUT "SPACE ON A CONTINUOUS BASIS";Q(8)
920 IF Q(8)<0 THEN 890
930 HG(8)=Q(8)*600
940 PRINT CHR$(147);:PRINT TAB(13);H$(9)
950 PRINT:PRINT "WHAT IS THE TOTAL WATTAGE OF"
960 PRINT "ELECTRICAL EQUIPMENT USED IN"
970 INPUT "THE SPACE TO BE COOLED";Q(9)
980 IF Q(9)<0 THEN 940
990 HG(9)=Q(9)*3
1000 BTU=INT(HG(7)+HG(8)+HG(9)):PRINT CHR$(147);
1010 PRINT TAB(6);"HEAT GAIN BY SOURCE"
1020 PRINT:PRINT TAB(23);"BTU/HR"
1030 PRINT TAB(23);"------":FOR X=1 TO 9
1040 Q$=STR$(INT(Q(X))):HG$=STR$(INT(HG(X)))
1050 IF X=7 THEN Q$=STR$(Q(7))
1060 IF X=6 THEN 1100
1070 E=15-LEN(H$(X))-LEN(Q$):G=13-LEN(L$(X))-LEN(HG$)
1080 PRINT H$(X);SPC(E);Q$;" ";L$(X);SPC(G);HG$
1090 GOTO 1120
1100 PRINT:PRINT H$(6);SPC(21-LEN(HG$));HG$
1110 PRINT DS$
1120 NEXT X:PRINT:PRINT "TOTAL COOLING LOAD";
1130 BT$=STR$(BTU):E=11-LEN(BT$):PRINT SPC(E);BT$
1140 PRINT:END
2000 GET Z$:IF Z$="" THEN 2000
2010 Z=ASC(Z$):Z$=CHR$(Z-32*(Z>96)*(Z<123))
2020 IF Z$<>"Y" AND Z$<>"N" THEN 2000
2030 RETURN
3000 SF=0:FOR Y=1 TO N
3010 PRINT:PRINT "WHAT ARE THE WIDTH AND HEIGHT"
3020 PRINT "OF WINDOW #";Y;:INPUT "IN INCHES";W,H
3030 IF W<0 OR H<0 THEN 3010
3040 SF=SF+((W*H)/144):NEXT Y:RETURN
4000 DATA NORTHEAST,EAST,SOUTHEAST,SOUTH,SOUTHWEST
4010 DATA WEST,NORTHWEST,NORTH,WINDOWS,WALLS,CEILING
4020 DATA FLOOR,DOORS,SUBTOTAL,MAP FACTOR,PEOPLE
4030 DATA LIGHTS,SQFT,FT,SQFT,SQFT,FT,FT,FT,FT,W
4040 DATA 20,20,20,30,30,30,5,19,3,8,3,3,7,12,4,5,200
4050 DATA 300,60,25,20,80,40,25,75,30,20,75,35,20,110
4060 DATA 45,30,150,65,45,120,50,35,0,0,0
```

IBM PC & compatibles/*A/C Sizer*

```
30 KEY OFF:WIDTH 40
40 DIM CF(9,2),DL(8),F(8,3),HG(9),Q(9)
50 DIM D$(8),H$(9),L$(9)
60 FOR X=1 TO 8:READ D$(X):NEXT X
70 FOR X=1 TO 9:READ H$(X):NEXT X
80 FOR X=1 TO 9:READ L$(X):NEXT X
90 FOR X=6 TO 8:L$(X)="":NEXT X
100 FOR X=1 TO 9:READ CF(X,1),CF(X,2):NEXT X
110 FOR X=1 TO 8:FOR Y=1 TO 3:READ F(X,Y):NEXT Y,X
120 CLS:PRINT TAB(11);"A/C SIZER":PRINT
130 PRINT "Will the air conditioner be"
140 PRINT "used only at night? ";:GOSUB 2000
150 PRINT Z$:IF Z$="Y" THEN T=1:HG(1)=0:GOTO 390
160 T=2:SP=0:DP=0:FOR X=1 TO 8:C=1:WT=1
170 CLS:PRINT TAB(12);H$(1):PRINT
180 PRINT "How many windows face":PRINT D$(X);
190 INPUT N:IF N<0 THEN 170
200 IF N=0 THEN DL(X)=0:GOTO 360
210 GOSUB 3000:PRINT
220 PRINT "Are these windows covered by"
230 PRINT "shades? ";:GOSUB 2000:PRINT Z$
240 IF Z$="Y" THEN C=2:GOTO 280
250 PRINT:PRINT "Are these windows covered by"
260 PRINT "outside awnings? ";:GOSUB 2000:PRINT Z$
270 IF Z$="Y" THEN C=3
280 PRINT:PRINT "Are the windows glass blocks? ";
290 GOSUB 2000:PRINT Z$
300 IF Z$="Y" THEN WT=.5:DP=DP+SF:GOTO 350
310 PRINT:PRINT "Are the windows double glass or"
320 PRINT "do they have storm windows? ";:GOSUB 2000
330 PRINT Z$:IF Z$="Y" THEN WT=.8:DP=DP+SF:GOTO 350
340 SP=SP+SF
350 DL(X)=SF*WT*F(X,C)
360 NEXT X:HG(1)=DL(1)
370 FOR X=2 TO 7:IF DL(X)>HG(1) THEN HG(1)=DL(X)
380 NEXT X:HG(1)=HG(1)+DP*7+SP*14:Q(1)=SP+DP:GOTO 480
390 CLS:PRINT TAB(12);H$(1):PRINT
400 PRINT "How many windows are single"
410 INPUT "glass";N:IF N<0 THEN 390
420 IF N=0 THEN 440
430 GOSUB 3000:HG(1)=HG(1)+SF*14:Q(1)=SF
440 PRINT:PRINT "How many windows are double"
450 INPUT "glass or glass block";N:IF N<0 THEN 440
460 IF N=0 THEN 480
470 GOSUB 3000:HG(1)=HG(1)+SF*7:Q(1)=Q(1)+SF
480 CLS:PRINT TAB(13);H$(2)
490 PRINT:PRINT "Are the outside walls of light"
500 PRINT "construction? ";:GOSUB 2000:PRINT Z$
510 IF Z$="Y" THEN CF(1,2)=30:CF(2,2)=60
520 PRINT:PRINT "What is the total length of the"
530 INPUT "room's exterior walls";TL:IF TL<0 THEN 520
540 HG(2)=TL*CF(2,T)
550 PRINT:PRINT "What is the length of exterior"
560 INPUT "walls facing North";L:IF L<0 THEN 550
570 HG(2)=HG(2)+L*(CF(1,T)-CF(2,T))
580 PRINT:PRINT "What is the total length of"
590 INPUT "interior walls";LI:IF LI<0 THEN 580
600 HG(2)=HG(2)+LI*CF(3,T):Q(2)=TL+LI
610 CLS:PRINT TAB(12);H$(3):A=4:B=0
620 PRINT:PRINT "What are the length and width"
630 INPUT "of the ceiling";L,W:IF L<0 OR W<0 THEN 610
640 Q(3)=L*W:Q(4)=Q(3)
650 PRINT:PRINT "Is the roof directly"
660 PRINT "overhead? ";:GOSUB 2000:PRINT Z$
670 IF Z$="Y" THEN A=1:A$="roof":GOTO 710
680 A$="ceiling":PRINT:PRINT "Is the attic directly"
690 PRINT "overhead? ";:GOSUB 2000:PRINT Z$
700 IF Z$="N" THEN A=3:GOTO 730
710 PRINT:PRINT "Is the ";A$;" insulated? ";
720 GOSUB 2000:PRINT Z$:IF Z$="Y" THEN B=1
730 R=A+B:HG(3)=Q(3)*CF(3+R,T)
740 CLS:PRINT TAB(13);H$(4)
750 PRINT:PRINT "Is there an occupied space"
760 PRINT "below you? ";:GOSUB 2000:PRINT Z$
770 IF Z$="N" THEN HG(4)=0 ELSE HG(4)=3*Q(4)
780 CLS:PRINT TAB(13);H$(5)
790 PRINT:PRINT "What is the width of doors"
```

```
800 PRINT "and arches continuously open"
810 INPUT "to unconditioned space";Q(5)
820 IF Q(5)<0 THEN 780
830 HG(5)=Q(5)*CF(9,T)
840 HG(6)=0:FOR X=1 TO 5:HG(6)=HG(6)+HG(X):NEXT X
850 CLS:PRINT TAB(11);H$(7)
860 PRINT:PRINT "What is the Map Factor"
870 INPUT "(see Figure #1)";Q(7)
880 IF Q(7)<.7 OR Q(7)>1.5 THEN 850
890 HG(7)=HG(6)*Q(7)
900 CLS:PRINT TAB(13);H$(8)
910 PRINT:PRINT "How many people will use the"
920 INPUT "space on a continuous basis";Q(8)
930 IF Q(8)<0 THEN 900
940 HG(8)=Q(8)*600
950 CLS:PRINT TAB(13);H$(9)
960 PRINT:PRINT "What is the total wattage of"
970 PRINT "electrical equipment used in"
980 INPUT "the space to be cooled";Q(9)
990 IF Q(9)<0 THEN 950
1000 HG(9)=Q(9)*3:BTU=INT(HG(7)+HG(8)+HG(9))
1010 CLS:PRINT TAB(6);"Heat Gain by Source"
1020 PRINT:PRINT TAB(24);"BTU/hr"
1030 PRINT TAB(24);"------"
1040 FOR X=1 TO 9:HG$=STR$(INT(HG(X)))
1050 IF X=7 THEN Q$=STR$(Q(X)) ELSE Q$=STR$(INT(Q(X)))
1060 IF X=6 THEN 1100
1070 E=15-LEN(H$(X))-LEN(Q$):G=13-LEN(L$(X))-LEN(HG$)
1080 PRINT H$(X);SPC(E);Q$;" ";L$(X);SPC(G);HG$
1090 GOTO 1120
1100 E=21-LEN(HG$):PRINT:PRINT H$(6);SPC(E);HG$
1110 PRINT STRING$(32,"-")
1120 NEXT X:PRINT:PRINT "Total Cooling Load";
1130 BT$=STR$(BTU):E=11-LEN(BT$):PRINT SPC(E);BT$
1140 PRINT:KEY ON:END
2000 Z$=INKEY$:IF Z$="" THEN 2000
2010 Z=ASC(Z$):Z$=CHR$(Z-32*(Z>96)*(Z<123))
2020 IF Z$<>"Y" AND Z$<>"N" THEN 2000 ELSE RETURN
3000 SF=0:FOR Y=1 TO N
3010 PRINT:PRINT "What are the width and height"
3020 PRINT "of window #";Y;:INPUT "in inches";W,H
3030 IF W<0 OR H<0 THEN 3010
3040 SF=SF+((W*H)/144):NEXT Y:RETURN
4000 DATA northeast,east,southeast,south,southwest
4010 DATA west,northwest,north,Windows,Walls,Ceiling
4020 DATA Floor,Doors,Subtotal,Map Factor,People
4030 DATA Lights,sqft,ft,sqft,sqft,ft,ft,ft,ft,W
4040 DATA 20,20,20,30,30,30,5,19,3,8,3,3,7,12,4,5,200
4050 DATA 300,60,25,20,80,40,25,75,30,20,75,35,20,110
4060 DATA 45,30,150,65,45,120,50,35,0,0,0
```

TI-99/4A w/32K Memory Expansion Card & TI Extended BASIC/*A/C Sizer*

```
10 DIM CF(9,2),DL(8),F(8,3),HG(9),Q(9)
20 DIM D$(8),H$(9),L$(9)
30 FOR X=1 TO 8 :: READ D$(X):: NEXT X
40 FOR X=1 TO 9 :: READ H$(X):: NEXT X
50 FOR X=1 TO 9 :: READ L$(X):: NEXT X
60 FOR X=6 TO 8 :: L$(X)="" :: NEXT X
70 FOR X=1 TO 9 :: READ CF(X,1),CF(X,2):: NEXT X
80 FOR X=1 TO 8 :: FOR Y=1 TO 3 :: READ F(X,Y)
90 NEXT Y :: NEXT X
100 CALL CLEAR :: PRINT TAB(9);"A/C SIZER" :: PRINT
110 PRINT "WILL THE AIR CONDITIONER BE"
120 PRINT "USED ONLY AT NIGHT? " :: GOSUB 2000
130 PRINT Z$
140 IF Z$="Y" THEN T=1 :: HG(1)=0 :: GOTO 410
150 T=2 :: SP=0 :: DP=0 :: FOR X=1 TO 8 :: C=1 :: WT=1
160 CALL CLEAR :: PRINT TAB(10);H$(1):: PRINT
170 PRINT "HOW MANY WINDOWS FACE" :: PRINT D$(X);
180 INPUT N :: IF N<0 THEN 160
190 IF N=0 THEN DL(X)=0 :: GOTO 370
```


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CIRCLE READER SERVICE 4

```
200 GOSUB 3000 :: PRINT
210 PRINT "ARE THESE WINDOWS COVERED"
220 PRINT "BY SHADES? ";:: GOSUB 2000 :: PRINT Z$
230 IF Z$="Y" THEN C=2 :: GOTO 270
240 PRINT :: PRINT "ARE THESE WINDOWS COVERED"
250 PRINT "BY OUTSIDE AWNINGS? ";:: GOSUB 2000
260 PRINT Z$ :: IF Z$="Y" THEN C=3
270 PRINT :: PRINT "ARE THE WINDOWS GLASS"
280 PRINT "BLOCKS? "
290 GOSUB 2000 :: PRINT Z$
300 IF Z$="Y" THEN WT=0.5 :: DP=DP+SF :: GOTO 360
310 PRINT :: PRINT "ARE THESE WINDOWS DOUBLE"
320 PRINT "GLASS OR DO THEY HAVE STORM"
330 PRINT "WINDOWS? ";:: GOSUB 2000 :: PRINT Z$
340 IF Z$="Y" THEN WT=0.8 :: DP=DP+SF :: GOTO 360
350 SP=SP+SF
360 DL(X)=SF*WT*F(X,C)
370 NEXT X :: HG(1)=DL(1)
380 FOR X=2 TO 7 :: IF DL(X)>HG(1)THEN HG(1)=DL(X)
390 NEXT X :: HG(1)=HG(1)+DP*7+SP*14
400 Q(1)=SP+DP :: GOTO 510
410 CALL CLEAR :: PRINT TAB(10);H$(1):: PRINT
420 PRINT "HOW MANY WINDOWS ARE SINGLE"
430 INPUT "GLASS? ":N :: IF N<0 THEN 410
440 IF N=0 THEN 460
450 GOSUB 3000 :: HG(1)=HG(1)+SF*14 :: Q(1)=SF
460 PRINT :: PRINT "HOW MANY WINDOWS ARE DOUBLE"
470 INPUT "GLASS OR GLASS BLOCKS? ":N
480 IF N<0 THEN 460
490 IF N=0 THEN 510
500 GOSUB 3000 :: HG(1)=HG(1)+SF*7 :: Q(1)=Q(1)+SF
510 CALL CLEAR :: PRINT TAB(11);H$(2)
520 PRINT :: PRINT "ARE THE OUTSIDE WALLS OF"
530 PRINT "LIGHT CONSTRUCTION? ";
540 GOSUB 2000 :: PRINT Z$
550 IF Z$="Y" THEN CF(1,2)=30 :: CF(2,2)=60
560 PRINT :: PRINT "WHAT IS THE TOTAL LENGTH"
570 PRINT "OF THE ROOM'S EXTERIOR"
580 INPUT "WALLS? ":TL :: IF TL<0 THEN 560
590 HG(2)=TL*CF(2,T)
600 PRINT :: PRINT "WHAT IS THE LENGTH OF"
610 PRINT "EXTERIOR WALLS FACING"
620 INPUT "NORTH? ":L :: IF L<0 THEN 600
630 HG(2)=HG(2)+L*(CF(1,T)-CF(2,T))
640 PRINT :: PRINT "WHAT IS THE TOTAL  LENGTH OF"
650 INPUT "INTERIOR WALLS? ":LI :: IF LI<0 THEN 640
660 HG(2)=HG(2)+LI*CF(3,T):: Q(2)=TL+LI
670 CALL CLEAR :: PRINT TAB(10);H$(3):: A=4 :: B=0
680 PRINT :: PRINT "WHAT ARE THE LENGTH AND"
690 INPUT "WIDTH OF THE CEILING? ":L,W
700 IF(L<0)+(W<0) THEN 670
710 Q(3)=L*W :: Q(4)=Q(3)
720 PRINT :: PRINT "IS THE ROOF DIRECTLY"
730 PRINT "OVERHEAD? ";:: GOSUB 2000 :: PRINT Z$
740 IF Z$="Y" THEN A=1 :: A$="ROOF" :: GOTO 790
750 A$="CEILING" :: PRINT
760 PRINT "IS THE ATTIC DIRECTLY"
770 PRINT "OVERHEAD? ";:: GOSUB 2000 :: PRINT Z$
780 IF Z$="N" THEN A=3 :: GOTO 810
790 PRINT :: PRINT "IS THE ";A$;" INSULATED? ";
800 GOSUB 2000 :: PRINT Z$ :: IF Z$="Y" THEN B=1
810 R=A+B :: HG(3)=Q(3)*CF(3+R,T)
820 CALL CLEAR :: PRINT TAB(11);H$(4)
830 PRINT :: PRINT "IS THERE AN OCCUPIED SPACE"
840 PRINT "BELOW YOU? ";:: GOSUB 2000 :: PRINT Z$
850 IF Z$="N" THEN HG(4)=0 :: GOTO 870
860 HG(4)=3*Q(4)
870 CALL CLEAR :: PRINT TAB(11);H$(5)
880 PRINT :: PRINT "WHAT IS THE WIDTH OF DOORS"
890 PRINT "AND ARCHES CONTINUOUSLY"
900 PRINT "OPEN TO UNCONDITIONED "
910 INPUT "SPACE? ":Q(5):: IF Q(5)<0 THEN 870
920 HG(5)=Q(5)*CF(9,T):: HG(6)=0
930 FOR X=1 TO 5 :: HG(6)=HG(6)+HG(X):: NEXT X
940 CALL CLEAR :: PRINT TAB(9);H$(7)
950 PRINT :: PRINT "WHAT IS THE MAP FACTOR"
960 INPUT "(SEE FIGURE #1)? ":Q(7)
970 IF (Q(7)<0.7)+(Q(7)>1.5)THEN 940
980 HG(7)=HG(6)*Q(7)
990 CALL CLEAR :: PRINT TAB(11);H$(8)
1000 PRINT :: PRINT "HOW MANY PEOPLE WILL USE"
1010 PRINT "THE SPACE ON A CONTINUOUS"
1020 INPUT "BASIS? ":Q(8):: IF Q(8)<0 THEN 990
1030 HG(8)=Q(8)*600
1040 CALL CLEAR :: PRINT TAB(11);H$(9)
1050 PRINT :: PRINT "WHAT IS THE TOTAL WATTAGE"
1060 PRINT "OF ELECTRICAL EQUIPMENT"
1070 PRINT "USED IN THE SPACE TO BE"
1080 INPUT "COOLED? ":Q(9):: IF Q(9)<0 THEN 1040
1090 HG(9)=Q(9)*3 :: BTU=INT(HG(7)+HG(8)+HG(9))
1100 CALL CLEAR :: PRINT TAB(4);"HEAT GAIN BY SOURCE"
1110 PRINT :: PRINT TAB(21);"BTU/HR"
1120 PRINT TAB(21);"------" :: FOR X=1 TO 9
1130 Q$=STR$(INT(Q(X))):: HG$=STR$(INT(HG(X)))
1140 IF X=7 THEN Q$=STR$(Q(X)):: GOTO 1160
1150 IF X=6 THEN 1190
1160 E=15-LEN(Q$):: G=27-LEN(HG$)
1170 PRINT H$(X);TAB(E);Q$;" ";L$(X);TAB(G);HG$
1180 GOTO 1210
1190 E=27-LEN(HG$):: PRINT :: PRINT H$(6);TAB(E);HG$
1200 FOR Y=1 TO 26 :: PRINT "-";:: NEXT Y
1210 NEXT X :: PRINT :: PRINT "TOTAL COOLING LOAD";
1220 BT$=STR$(BTU):: E=27-LEN(BT$)
1230 PRINT TAB(E);BT$ :: PRINT :: END
2000 CALL KEY(3,K,S):: IF S=0 THEN 2000
2010 Z$=CHR$(K):: IF (Z$<>"Y")*(Z$<>"N") THEN 2000
2020 RETURN
3000 SF=0 :: FOR Y=1 TO N
3010 PRINT :: PRINT "WHAT ARE THE WIDTH AND"
3020 PRINT "HEIGHT OF WINDOW #";Y;
3030 INPUT "IN INCHES? ":W,H
3040 IF (W<0)+(H<0) THEN 3010
3050 SF=SF+(W*H/144):: NEXT Y :: RETURN
4000 DATA NORTHEAST,EAST,SOUTHEAST,SOUTH,SOUTHWEST
4010 DATA WEST,NORTHWEST,NORTH,WINDOWS,WALLS,CEILING
4020 DATA FLOOR,DOORS,SUBTOTAL,MAP FACTOR,PEOPLE
4030 DATA LIGHTS,SQFT,FT,SQFT,SQFT,FT,FT,FT,FT,W
4040 DATA 20,20,20,30,30,30,5,19,3,8,3,3,7,12,4,5,200
4050 DATA 300,60,25,20,80,40,25,75,30,20,75,35,20,110
4060 DATA 45,30,150,65,45,120,50,35,0,0,0
```

MODIFICATIONS FOR OTHER COMPUTERS

Macintosh w/Microsoft BASIC 2.0 or 2.1/*A/C Sizer*

Use the IBM PC version, with the following alterations: Add lines 10 and 20, and change lines 30 and 1140 to read as follows:

```
10 CALL TEXTFONT(4):CALL TEXTSIZE(9)
20 CALL TEXTMODE(0)
30 WINDOW 1,"",(0,38)-(527,338)
1140 PRINT:END
```

Tandy Color Computer W/Extended BASIC/*A/C Sizer*

Use the IBM PC version, with the following alterations: Type all lowercase letters as capitals. Delete line 30 and 1030. Finally, change lines 1080, 1100, 1130, and 1140 to read as follows:

```
1080 PRINT H$(X);STRING$(E,32);Q$;" ";L$(X);STRING$(G,
32);HG$
1100 E=21-LEN(HG$):PRINT:PRINT H$(6);STRING$(E,32);HG$
1130 BT$=STR$(BTU):E=11-LEN(BT$):PRINT STRING$(E,32);B
T$
1140 FOR D=1 TO 500:NEXT D:PRINT:END
```

CROSSWORD PUZZLER

BY STEVE C.M. CHEN AND KAREN KANE

This is the first in a series of crossword puzzles that we plan to publish. This month, Crossword Puzzler *has a Fourth of July theme and is presented for Commodore 64/128, IBM PC & compatibles, and the Tandy Color Computer. The solution to this puzzle will appear in next month's issue along with data for a new puzzle and translations for Adam, Apple, Atari, and Macintosh computers.*

If you are tired of newspaper crossword puzzles that are smudged and ripped from repeated erasures, if you get cross-eyed from deciphering the layers of inked-in letters when you try to solve a puzzle in pen, or if you are just a fan of challenging puzzles, then *Crossword Puzzler* is the program for you! Type in and run the program, then type in a few short lines of data we supply each month, and you'll be able to solve (or print out) that month's FAMILY COMPUTING crossword puzzle. Or you can create your own crossword puzzle for a friend to solve. You can even duplicate a puzzle that you see in a book or newspaper and solve it on your computer screen instead! No muss, no fuss.

Solving crossword puzzles can be a fun and educational activity for an individual or for the whole family. The exercise often requires concentration and can be a painless way to improve vocabulary. You may find that as far as crossword puzzles are concerned, the old adage "two heads are better than one" holds especially true.

To use our crossword puzzle, just type in the version for your computer and SAVE it. When you RUN the program, a main menu will offer you five choices:
‹1› Create your own crossword puzzle, ‹2› Work on an existing puzzle, ‹3› Create a puzzle using FC data, ‹4› Solve a puzzle, or ‹5› Quit.

‹1› CREATE YOUR OWN PUZZLE

When you choose ‹1› from the main menu, a 15-by-15 grid of dots appears on the screen. The letters A–O run across the top of the grid corresponding to the vertical columns, and the numbers 1–15 appear to the side of the grid corresponding to the horizontal rows. This grid is where you enter the letters and solid blocks that make up any crossword design.

Along with the grid is a command menu that lists the operations available when you create your own puzzle. There is also a cursor-position indicator, and an Across/Down indicator showing the direction the cursor will move when you type in a letter or block. To switch between the Down mode and the Across mode, press CTRL-A for Across or CTRL-D for Down. (NOTE: *On the Tandy Color Computer press "/" instead of CTRL. See special instructions for CoCo below.*)

The cursor starts in the upper left-hand corner at position 1A ready for you to input a letter or solid block. To enter a letter just type it. Enter a solid block by pressing CTRL-B. Or, if you want to just move around the grid, use the cursor keys. The grid is set up for a 15-by-15-square puzzle, but if you want to do a smaller puzzle, make a new border by filling in the extra squares with solid blocks. To "erase" an entry, type over it with a new letter or a block, or type a period (".") to leave the square blank. At any time, you can print the current puzzle with the CTRL-P command. When you are ready to stop creating a puzzle, you can either press CTRL-S to SAVE your completed or partially completed work and return to the main menu or press CTRL-E to exit to the main menu without saving. If you choose this option, you'll lose all your work!

‹2› WORK ON AN EXISTING PUZZLE

This feature allows you to load a previously saved puzzle that you have started to design and wish to change. When the puzzle appears on the screen, you can use all the same commands that are available when creating a puzzle. Make sure to save your new version under a new name, unless you want to save over the old one.

‹3› CREATE A PUZZLE USING FC DATA

When you choose to create one of FAMILY COMPUTING's puzzles (option ‹3› on the main menu), a table will appear where you input the data for one of our original puzzles. This month the puzzle has a Fourth of July theme, and the data listed below establish the pattern of blank spaces and solid blocks that relates to the crossword clues. If you make a mistake in inputing data, an error message will appear and you must correct the error in order to continue. Once all of the data is correctly entered, you must save it. You can exit the data input feature without saving by typing CTRL-E, but no warning will be given.

‹4› SOLVE A PUZZLE

To solve a puzzle, choose 4 from the main menu and type in the name of the saved puzzle that you wish to work on. You can load either a FAMILY COMPUTING puzzle or one that you or a friend has designed. In either case, the unsolved or partially solved puzzle pattern will appear ready for input. You can move around the puzzle in the same manner as when creating a puzzle, but the option to add or erase blocks is not available.

As you begin to fill in the squares of the puzzle, you may wish to save the incomplete solution and come back to it later. You can also get a printout of your puzzle with the CTRL-P command.

‹5› QUIT

Choose this option to exit from the program. You will be asked if you are sure you want to quit so that if you haven't saved or printed your latest work, you have a chance to go back and do so.

ILLUSTRATION BY JOSH GOSFIELD

SPECIAL INSTRUCTIONS FOR COCO PUZZLERS

On the Tandy Color Computer, there is no CTRL key. To perform a control function you simply type slash (/) and then the key that corresponds to the operation you want. For example, to get into the Across mode you would type /, which makes the blinking cursor disappear, and then type the "A" key. If you don't want to do one of the commands in the menu (for example: ‹S›ave, ‹P›rint, or ‹B›lock), press any other key and the cursor will return.

Whenever you access the disk on the CoCo, make sure that your disk is securely in the drive and that the disk-drive door is closed. If you try to save to an empty disk drive, your latest work will be lost.

HINTS ON SAVING

When saving your puzzles, it's a good idea to give them names to distinguish between puzzles that are being created and ones that are being solved. It may also help to differentiate between the different stages of creation if you want to keep the old versions.

For example, if you are creating a puzzle with beach words, you may save the first version as MYBEACH.1 and a final version as MYBEACH.SOL. This final version can then be used in two ways by *Crossword Puzzler*. If it is loaded from menu option ‹4› SOLVE A PUZZLE, only the pattern of blocks will show up on screen so the puzzle is ready for someone to solve. If MYBEACH.SOL is loaded from menu option ‹2› WORK ON AN EXISTING PUZZLE, the completed puzzle shows up. Try not to peek at a solution until you are finished with a puzzle. While solving a puzzle, it is very important to save partially solved puzzles with a name different from the solution.

Fourth of July Puzzle Data

```
A EAJA,NAOA,EBJB,OBAC,1112
B ECJC,ADAE,BECE,GEHE,1096
C IELE,MEMF,NFOF,DGGG,1158
D IGJG,EHGH,KHOH,FIGI,1158
E LIAJ,BJCJ,CKDK,HKIK,1149
F MKNK,OLFM,GMKM,FNKN,1208
F FOGO,KOZZ,ZZZZ,ZZZZ,6353
```

Fourth of July Puzzle Clues

Across

1A One of the unalienable rights
1F Confine
1K This is for horses
2A Comes in skeins
2F ————Kari (Japanese ritual suicide)
2K Ahab is one
3B National Electronics Corporation, abbr.
3F "Often ———— up in my room reading . . ."—BENJAMIN FRANKLIN (2 words)
3K More current
4B How an atlas is organized
5D A rodent
5J Opposite of yes
5N French article
6A What the U.S. celebrates on July 4th
7A Org. of patriotic women
7E Compass direction
7K Type of sailboat
8A Actor Sharif
8H Creative craft
8L A language in Thailand
9A Conforming to the law
9H Pre-adult
9M Pouch
10D Dessert for Americans on July 4th (2 words)
11A Hawkeye's pal
11E Exclude
11J For each
12A Taxation without ——
13A To go in Paris
13H Hearing organ
13L Send out
14A What Rip van Winkle did
14G Sharp taste
14L Anagram for rain
15A Sudsy
15H Trinket
15L Symbol on the American flag

Down

1A Suffix for relative or slow
1B Tr——le: three-sided figure
1C No charge
1D Additional performance
1F Number of American states in 1776
1G Tabula —— (blank slate)
1H Accounts Receivable/Accounts Payable, abbr.
1I Essential part
1K This last name is the largest signature on the Declaration of Independence
1L Length X width
1M Type of sailboat
2N Cymbal of liberty?
3O Type of bread or whiskey
4E Openings
4J Tavern
6A Object of worship
6B Title
6C Pull
6H One of Patrick Henry's options
6L Moray
7M A coarse cloth
7N Prepare food
8D Rhythm & Blues, abbr.
8I Color in the American flag
8J Rebellion in Boston
9E See 1A Across
9K No to Gorbachev
9O Condensed moisture
10F Egyptian sun-god and abbr. for radium
10G Three in Florence
10L Officers who proclaim court orders
11A Copper and zinc alloy
11B Brand-name gelatin dessert
12C Apology
12D Coarse-weave fabric or type of tie
12H Tidy
12I Edible root
12M Leave out
12N Name in a Hirschfeld drawing
13O Used with feathers for punishment or humiliation

Commodore 64 & 128 (C 64 mode) w/disk drive (printer optional)/*Crossword Puzzler*

```
10 DIM BD$(15,15),CU$(4),DM$(2),MU$(5),N$(15)
20 POKE 649,10:POKE 650,128:POKE 53280,12
30 POKE 53281,12:S=54272
40 FOR L=0 TO 23:POKE S+L,0:NEXT L
50 POKE S+5,12:POKE S+6,0:POKE S+1,100:POKE S+24,15
60 CS$=CHR$(147):P$=CHR$(46):SP$=CHR$(32)
70 BA$=CHR$(144):BE$=CHR$(31):WH$=CHR$(5)
80 DM$(1)="-- ACROSS"+SP$
90 DM$(2)="-- DOWN"+SP$+SP$+SP$:M$=P$+SP$
100 BK$=CHR$(18)+SP$+CHR$(146)+CHR$(181)
110 RV$=WH$+CHR$(18)+SP$+CHR$(146)+BA$+CHR$(157)
120 BF$=CHR$(99):FOR L=2 TO 39:BF$=BF$+CHR$(99):NEXT L
130 CL$=SP$:FOR L=2 TO 37:CL$=CL$+SP$:NEXT L
140 PF$="#":FOR L=2 TO 33:PF$=PF$+"#":NEXT L
150 UL$=CHR$(164):FOR L=2 TO 4:UL$=UL$+CHR$(164):NEXT
L
160 FOR L=1 TO 15:N$(L)=MID$(STR$(L),2)+SP$:NEXT L
170 FOR L=1 TO 5:READ MU$(L):NEXT L:PRINT CHR$(5)
180 FOR L=1 TO 4:READ T:CU$(L)=CHR$(T):NEXT L
190 CLOSE 2:CLOSE 4:CLOSE 15
200 PRINT CS$;:LM=1:TM=0:WD=38:HT=9:GOSUB 2000
210 PRINT CHR$(19);TAB(10);BE$;" CROSSWORD PUZZLER "
220 PRINT WH$:FOR L=1 TO 5
230 PRINT TAB(2);MU$(L):NEXT L
240 POKE 214,7:PRINT:PRINT TAB(15);"SELECTION:";
250 GOSUB 2500:MS=VAL(K$)
260 IF MS<1 OR MS>5 THEN DL=50:GOSUB 3000:GOTO 250
270 PRINT CS$;:ON MS GOTO 280,280,1070,300,1520
280 C$="BAEDPS":W=0:IF MS=2 THEN 310
290 GOSUB 3500:GOTO 470
300 C$="EASDP":W=1
310 PRINT CS$;:F$=""
320 INPUT "WHAT IS THE NAME OF THIS PUZZLE";F$
330 IF F$="" THEN 200
340 GOSUB 4000:IF ER<>0 THEN GOSUB 5000:GOTO 310
350 OPEN 2,8,2,NF$+",R":INPUT#2,T
360 IF W=0 AND T=1 THEN 420
370 FOR Y=1 TO 15:FOR X=1 TO 15:INPUT#2,BD$(X,Y)
380 NEXT X,Y:CLOSE 2:IF W=0 OR T=1 THEN 470
390 FOR X=1 TO 15:FOR Y=1 TO 15
400 IF BD$(X,Y)<>BK$ THEN BD$(X,Y)=M$
410 NEXT Y,X:GOTO 470
420 CLOSE 2:DL=100:GOSUB 3000
430 PRINT CS$;"SORRY!  THIS FILE IS NOT LOADABLE FROM"
440 PRINT "MENU CHOICE 2.":PRINT "CHOOSE ";BA$;
450 PRINT "<4> SOLVE A PUZZLE TO LOAD IT.";WH$
```

```
460 GOSUB 4500:GOTO 310
470 PRINT CS$;:TM=1:LM=3:WD=33:HT=15:GOSUB 2000
480 PRINT CHR$(19);BE$;TAB(5);
490 FOR L=1 TO 15:PRINT CHR$(64+L);SP$;:NEXT L
500 FOR Y=1 TO 15:POKE 214,Y:PRINT
510 PRINT BE$;N$(Y);TAB(5);BA$;
520 FOR X=1 TO 15:PRINT BD$(X,Y);:NEXT X,Y:SK=2
530 POKE 214,18:PRINT BA$:IF MS=4 THEN 570
540 PRINT TAB(3);"<CRTL>+<A>=ACROSS <CRTL>+<B>=BLOCK"
550 PRINT TAB(3);"<CRTL>+<D>=DOWN   <CRTL>+<E>=EXIT"
560 CX=1:CY=1:GOTO 620
570 CX=0:CY=0:FOR Y=1 TO 15:FOR X=1 TO 15
580 IF BD$(X,Y)=M$ THEN CX=X:CY=Y:X=15:Y=15
590 NEXT X,Y
600 PRINT TAB(3);"<CRTL>+<A>=ACROSS <CRTL>+<D>=DOWN"
610 PRINT TAB(3);"<CRTL>+<E>=EXIT"
620 PRINT TAB(3);"<CRTL>+<P>=PRINT CURRENT PUZZLE"
630 PRINT TAB(3);"<CRTL>+<S>=SAVE & RETURN TO MENU"
640 IF CX<>0 THEN 670
650 BD$(1,1)=M$:CX=1:CY=1
660 POKE 214,1:PRINT:PRINT TAB(5);M$
670 POKE 214,17:PRINT
680 PRINT TAB(13);BE$;CHR$(64+CX);N$(CY);DM$(SK/2);BA$
690 POKE 214,CY:PRINT:PRINT TAB(CX*2+3);
700 PRINT RV$;BD$(CX,CY)
710 GET K$:IF K$="" THEN 690
720 DK=0:FOR L=1 TO 4:IF CU$(L)=K$ THEN DK=L:L=4
730 NEXT L:IF DK<>0 THEN GOSUB 5500:GOTO 670
740 IF K$>CHR$(31) THEN 1020
750 CK=0:T$=CHR$(ASC(K$)+64):FOR L=1 TO LEN(C$)
760 IF MID$(C$,L,1)=T$ THEN CK=L:L=LEN(C$)
770 NEXT L:IF CK=0 THEN DL=50:GOSUB 3000:GOTO 690
780 IF W=0 THEN ON CK GOTO 800,810,820,810,870,1010
790 ON CK GOTO 820,810,1010,810,870
800 K$=BK$:GOTO 1040
810 SK=CK:GOTO 670
820 NL=5:GOSUB 6000:DL=50:GOSUB 3000:POKE 214,17:PRINT
830 PRINT "YOU HAVE NOT SAVED THIS PUZZLE."
840 PRINT "ARE YOU SURE YOU WANT TO EXIT?";
850 GOSUB 6500:NL=2:GOSUB 6000
860 ON ABS(K$="Y") GOTO 200:GOTO 530
870 NL=5:GOSUB 6000:POKE 214,17:PRINT
880 PRINT "PRESS ANY KEY WHEN PRINTER IS READY.";
890 GET K$:IF K$="" THEN 890
900 NL=1:GOSUB 6000:OPEN 4,4
910 PRINT#4,SPC(5);:FOR L=1 TO 15
920 PRINT#4,CHR$(64+L);SP$;:NEXT L:PRINT#4
930 PRINT#4,SPC(3);PF$
940 FOR Y=1 TO 15:PRINT#4,N$(Y);
950 IF Y<10 THEN PRINT#4,SP$;
960 PRINT#4,"#";SP$;:FOR X=1 TO 15:T$=BD$(X,Y)
970 IF T$<>BK$ THEN PRINT#4,T$;:GOTO 990
980 PRINT#4,"*";SP$;
990 NEXT X:PRINT#4,"#";SP$;N$(Y):NEXT Y
1000 PRINT#4,SPC(3);PF$:CLOSE 4:GOTO 530
1010 GOSUB 7000:ON ABS(F$="") GOTO 470:GOTO 200
1020 IF (K$<"A" OR K$>"Z") AND K$<>P$ THEN DL=50:GOSUB
 3000:GOTO 690
1030 K$=K$+SP$
1040 BD$(CX,CY)=K$
1050 POKE 214,CY:PRINT:PRINT TAB(CX*2+3);K$
1060 DK=SK:GOSUB 5500:GOTO 670
1070 LM=1:TM=0:WD=30:HT=15:GOSUB 2000
1080 PRINT CHR$(19);TAB(8);BE$;" INPUT FC DATA ";WH$
1090 GOSUB 3500:ZY=1:H$=UL$:T$=UL$:FOR L=1 TO 4
1100 H$=H$+","+UL$:T$=T$+UL$:NEXT L:CD$=""
1110 POKE 214,ZY-1:PRINT
1120 PRINT TAB(3);BE$;CHR$(64+ZY);SP$;BA$;H$;WH$
1130 L$=T$:ZX=0
1140 POKE 214,17:PRINT
1150 PRINT "PRESS <RETURN> TO MOVE TO NEXT LINE"
1160 PRINT "OR <CRTL>+<E> TO EXIT WITHOUT SAVING."
1170 POKE 214,ZY-1:PRINT:PRINT TAB(ZX+5+INT(ZX/4));
1180 PRINT RV$;MID$(L$,ZX+1,1)
1190 GET K$:IF K$="" THEN 1170
1200 DK=0:FOR L=1 TO 2:IF CU$(L)=K$ THEN DK=L:L=2
```


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```
1210 NEXT L:IF DK=0 THEN 1240
1220 ZX=ZX+(DK=1)-(DK=2)
1230 ZX=ZX+((ZX=20)-(ZX=-1))*20:GOTO 1170
1240 IF K$=CHR$(5) THEN DL=100:GOSUB 3000:GOTO 200
1250 IF K$<>CHR$(13) THEN 1470
1260 NL=2:GOSUB 6000:CV=VAL(RIGHT$(L$,4))
1270 CT=0:FOR L=1 TO 16:CT=CT+ASC(MID$(L$,L,1)):NEXT L
1280 IF CT=CV+(CV>5000)*5000 THEN 1320
1290 DL=100:GOSUB 3000:POKE 214,17:PRINT
1300 PRINT CHR$(28);"YOU HAVE MADE A TYPO IN LINE ";CH
R$(64+ZY);".";WH$
1310 GOSUB 4500:NL=3:GOSUB 6000:ZX=0:GOTO 1140
1320 IF CV>5000 THEN 1350
1330 CD$=CD$+LEFT$(L$,16):ZY=ZY+1
1340 ON ABS(ZY<16) GOTO 1110:GOTO 1380
1350 T=16:FOR L=1 TO 15 STEP 2
1360 IF MID$(L$,L,1)="Z" THEN T=L-1:L=15
1370 NEXT L:CD$=CD$+LEFT$(L$,T)
1380 FOR L=1 TO LEN(CD$)-1 STEP 2
1390 X$=MID$(CD$,L,1):Y$=MID$(CD$,L+1,1)
1400 BD$(ASC(X$)-64,ASC(Y$)-64)=BK$:NEXT L
1410 GOSUB 7000:IF F$="" THEN GOSUB DL=100:2700:GOTO 1
410
1420 PRINT CS$;"PRESS <M> FOR MENU OR <S> TO SOLVE"
1430 PRINT "THE PUZZLE.";
1440 GOSUB 2500:IF K$<>"M" AND K$<>"S" THEN GOSUB 3000
:GOTO 1440
1450 IF K$="M" THEN 200
1460 MS=4:W=1:C$="EASDP":GOTO 470
1470 K=ASC(K$)
1480 IF (K<65 OR K>90) AND (K<48 OR K>57) THEN DL=50:G
OSUB 3000:GOTO 1170
1490 POKE 214,ZY-1:PRINT:PRINT TAB(ZX+5+INT(ZX/4));K$
1500 L$=LEFT$(L$,ZX)+K$+MID$(L$,ZX+2)
1510 ZX=ZX+1+(ZX=19):GOTO 1170
1520 DL=50:GOSUB 3000
1530 PRINT "ARE YOU SURE YOU WANT TO QUIT?";
1540 GOSUB 6500:IF K$="N" THEN 200
1550 PRINT CS$;CHR$(154);
1560 POKE 53280,14:POKE 53281,6:END
2000 T$=LEFT$(BF$,WD-2):PRINT CHR$(19);WH$;
2010 IF TM=0 THEN 2030
2020 FOR L=1 TO TM:PRINT:NEXT L
2030 PRINT TAB(LM);CHR$(176);T$;CHR$(174)
2040 FOR Y=1 TO HT:POKE 214,TM+Y
2050 PRINT TAB(LM);CHR$(125);SPC(WD-2);CHR$(125)
2060 NEXT Y:POKE 214,TM+HT:PRINT
2070 PRINT TAB(LM);CHR$(173);T$;CHR$(189):RETURN
2500 GET K$:ON ABS(K$="") GOTO 2500:RETURN
3000 POKE S+4,17:FOR D=1 TO DL:NEXT D
3010 POKE S+4,16:RETURN
3500 FOR X=1 TO 15:FOR Y=1 TO 15
3510 BD$(X,Y)=M$:NEXT Y,X:RETURN
4000 NF$="0:"+F$+",S"
4010 OPEN 2,8,2,NF$+",R":CLOSE 2:OPEN 15,8,15
4020 INPUT#15,ER,ER$,E2,E3:CLOSE 15:RETURN
4500 PRINT:PRINT "PRESS ANY KEY TO CONTINUE.";
4510 GOSUB 2500:RETURN
5000 PRINT:DL=100:GOSUB 3000
5010 PRINT CHR$(28);"DISK I/O ERROR.";WH$:PRINT
5020 PRINT "PLEASE CHECK DISK AND DISK DRIVE."
5030 GOSUB 4500:RETURN
5500 ON DK GOTO 5510,5510,5530,5530
5510 CX=CX+(DK=1)-(DK=2)
5520 CX=CX+((CX=16)-(CX=0))*15:GOTO 5550
5530 CY=CY+(DK=3)-(DK=4)
5540 CY=CY+((CY=16)-(CY=0))*15
5550 IF BD$(CX,CY)=BK$ AND W=1 THEN 5500
5560 RETURN
6000 POKE 214,17:PRINT WH$:FOR L=1 TO NL:PRINT CL$
6010 NEXT L:RETURN
6500 GOSUB 2500:IF K$<>"Y" AND K$<>"N" THEN DL=50:GOSU
B 3000:GOTO 6500
6510 RETURN
7000 PRINT CS$;WH$;:F$=""
7010 INPUT "SAVE UNDER WHAT NAME";F$
7020 IF F$="" THEN RETURN
7500 GOSUB 4000:IF ER<>0 AND ER<>62 THEN 7550
7510 IF ER=0 THEN NF$="@"+NF$
7520 OPEN 2,8,2,NF$+",W":PRINT#2,W
7530 FOR Y=1 TO 15:FOR X=1 TO 15
7540 PRINT#2,BD$(X,Y):NEXT X,Y:CLOSE 2:RETURN
7550 GOSUB 5000:F$="":RETURN
8000 DATA <1> CREATE YOUR OWN CROSSWORD PUZZLE
8010 DATA <2> WORK ON AN EXISTING PUZZLE
8020 DATA <3> CREATE A PUZZLE USING FC DATA
8030 DATA <4> SOLVE A PUZZLE,<5> QUIT
8500 DATA 157,29,145,17
```

IBM PC & compatibles (printer optional)/*Crossword Puzzler*

```
10 DEF SEG=&H40:V=PEEK(&H10) AND 48:DEF SEG
20 KEY OFF:IF V=32 THEN WIDTH 40:VL=7 ELSE VL=12
30 DIM BD$(15,15),DM$(2),MU$(5),N$(15)
40 LOCATE ,,0,0,VL:COLOR ,0:BK$=CHR$(219)+CHR$(221)
50 P$=CHR$(46):SP$=CHR$(32):CL$=STRING$(37,32)
60 UL$=STRING$(4,95):DM$(1)="-- ACROSS"+SP$
70 DM$(2)="-- DOWN"+SP$+SP$+SP$:M$=P$+SP$
80 FOR L=1 TO 15:N$(L)=MID$(STR$(L),2)+SP$:NEXT L
90 FOR L=1 TO 5:READ MU$(L):NEXT L
100 CLS:LM=1:TM=1:WD=40:HT=9:GOSUB 2000
110 COLOR 14:LOCATE 1,12
120 PRINT " CROSSWORD PUZZLER ":COLOR 2
130 FOR L=1 TO 5:LOCATE 2+L,3:PRINT MU$(L):NEXT L
140 LOCATE 9,15:PRINT "Selection: ";
150 GOSUB 2500:MS=VAL(K$)
160 IF MS<1 OR MS>5 THEN SOUND 400,2:GOTO 150
170 CLS:ON MS GOTO 180,180,1000,200,1440
180 C$="BAEDPS":W=0:IF MS=2 THEN 210
190 GOSUB 3000:GOTO 390
200 C$="EASDP":W=1
210 CLS:INPUT "What is the name of this puzzle";F$
220 IF F$="" THEN 100
230 ON ERROR GOTO 370
240 OPEN F$ FOR INPUT AS #1:INPUT#1,T
250 IF W=0 AND T=1 THEN 320
260 FOR Y=1 TO 15:FOR X=1 TO 15:INPUT#1,BD$(X,Y)
270 NEXT X,Y:CLOSE#1:ON ERROR GOTO 0
280 IF W=0 OR T=1 THEN 390
290 FOR X=1 TO 15:FOR Y=1 TO 15
300 IF BD$(X,Y)<>BK$ THEN BD$(X,Y)=M$
310 NEXT Y,X:GOTO 390
320 CLOSE#1:ON ERROR GOTO 0:CLS:SOUND 800,6
330 PRINT "Sorry!  This file is not loadable from"
340 PRINT "menu choice 2.":PRINT "Select ";:COLOR 14
350 PRINT "<4> Solve a puzzle to load it.":COLOR 2
360 GOSUB 3500:GOTO 210
370 CLOSE#1:RESUME 380
380 ON ERROR GOTO 0:GOSUB 4000:GOTO 210
390 CLS:TM=2:LM=4:WD=33:HT=15:GOSUB 2000
400 COLOR 14:LOCATE 1,6
410 FOR L=1 TO 15:PRINT CHR$(64+L);SP$;:NEXT L
420 FOR Y=1 TO 15:LOCATE 2+Y,1:PRINT N$(Y);:COLOR 2
430 LOCATE 2+Y,6:FOR X=1 TO 15:PRINT BD$(X,Y);
440 NEXT X:COLOR 14:LOCATE Y+2,38:PRINT N$(Y)
450 NEXT Y:COLOR 2:SK=2
460 LOCATE 20,1:IF MS=4 THEN 500
470 PRINT TAB(4);"<CRTL>+<A>=Across <CRTL>+<B>=Block"
480 PRINT TAB(4);"<CRTL>+<D>=Down   <CRTL>+<E>=Exit"
490 CX=1:CY=1:GOTO 550
500 CX=0:CY=0:FOR Y=1 TO 15:FOR X=1 TO 15
510 IF BD$(X,Y)=M$ THEN CX=X:CY=Y:X=15:Y=15
520 NEXT X,Y
530 PRINT TAB(4);"<CRTL>+<A>=Across <CRTL>+<D>=Down"
540 PRINT TAB(4);"<CRTL>+<E>=Exit"
550 PRINT TAB(4);"<CRTL>+<P>=Print Current Puzzle"
560 PRINT TAB(4);"<CRTL>+<S>=Save & Return to Menu"
570 IF CX<>0 THEN 590
580 BD$(1,1)=M$:CX=1:CY=1:LOCATE 3,6:PRINT M$
590 COLOR 14:LOCATE 19,14
```

```
600 PRINT CHR$(64+CX);N$(CY);DM$(SK/2):COLOR 2
610 LOCATE CY+2,CX*2+4:PRINT CHR$(219);CHR$(29);SP$
620 LOCATE CY+2,CX*2+4:PRINT BD$(CX,CY)
630 K$=INKEY$:IF K$="" THEN 610
640 IF LEN(K$)=1 THEN GOSUB 2530:GOTO 680
650 DK=INSTR("KMHP",RIGHT$(K$,1))
660 IF DK=0 THEN SOUND 400,2:GOTO 610
670 GOSUB 4500:GOTO 590
680 IF K$>CHR$(31) THEN 960
690 CK=INSTR(C$,CHR$(ASC(K$)+64))
700 IF CK=0 THEN SOUND 400,2:GOTO 610
710 IF W=0 THEN ON CK GOTO 730,740,750,740,800,950
720 ON CK GOTO 750,740,950,740,800
730 K$=BK$:GOTO 970
740 SK=CK:GOTO 590
750 NL=5:GOSUB 5000:SOUND 400,4:LOCATE 19,1
760 PRINT "You have not saved this puzzle."
770 PRINT "Are you sure you want to exit? ";
780 GOSUB 5500:NL=2:GOSUB 5000
790 IF K$="Y" THEN 100 ELSE 460
800 NL=5:GOSUB 5000:LOCATE 19,1
810 PRINT "Press any key when printer is ready.";
820 IF INKEY$="" THEN 820
830 ON ERROR GOTO 930
840 NL=1:GOSUB 5000:LPRINT SPC(5);:FOR L=1 TO 15
850 LPRINT CHR$(64+L);SP$;:NEXT L:LPRINT
860 LPRINT SPC(3);STRING$(33,"#")
870 FOR Y=1 TO 15:LPRINT N$(Y);
880 IF Y<10 THEN LPRINT SP$;
890 LPRINT "#";SP$;:FOR X=1 TO 15:T$=BD$(X,Y)
900 IF T$<>BK$ THEN LPRINT T$; ELSE LPRINT "*";SP$;
910 NEXT X:LPRINT "#";SP$;N$(Y):NEXT Y
920 LPRINT SPC(3);STRING$(33,"#"):GOTO 460
930 SOUND 400,6:RESUME 940
940 ON ERROR GOTO 0:GOTO 800
950 GOSUB 6000:IF F$="" THEN 390 ELSE 100
960 IF (K$<"A" OR K$>"Z") AND K$<>P$ THEN SOUND 400,2:
GOTO 610 ELSE K$=K$+SP$
970 BD$(CX,CY)=K$
980 LOCATE CY+2,CX*2+4:PRINT K$
990 DK=SK:GOSUB 4500:GOTO 590
1000 LM=2:TM=1:WD=30:HT=15:GOSUB 2000:COLOR 14
1010 LOCATE 1,9:PRINT " INPUT FC DATA ":GOSUB 3000
1020 ZY=1:H$=UL$:FOR L=1 TO 4
1030 H$=H$+","+UL$:NEXT L:CD$=""
1040 COLOR 10:LOCATE ZY+1,4:PRINT CHR$(64+ZY);SP$;
1050 COLOR 2:PRINT H$:L$=STRING$(20,95):ZX=0
1060 LOCATE 19,1
1070 PRINT "Press <ENTER> to move to next line"
1080 PRINT "or <CRTL>+<E> to exit without saving."
1090 LOCATE ZY+1,ZX+6+INT(ZX/4):PRINT CHR$(219)
1100 LOCATE ZY+1,ZX+6+INT(ZX/4):PRINT MID$(L$,ZX+1,1)
1110 K$=INKEY$:IF K$="" THEN 1090
1120 IF LEN(K$)=1 THEN GOSUB 2530:GOTO 1170
1130 DK=INSTR("KM",RIGHT$(K$,1))
1140 IF DK=0 THEN SOUND 400,2:GOTO 1090
1150 ZX=ZX+(DK=1)-(DK=2)
1160 ZX=ZX+((ZX=20)-(ZX=-1))*20:GOTO 1090
1170 IF K$=CHR$(5) THEN SOUND 800,6:GOTO 100
1180 IF K$<>CHR$(13) THEN 1400
1190 NL=2:GOSUB 5000:CV=VAL(RIGHT$(L$,4))
1200 CT=0:FOR L=1 TO 16:CT=CT+ASC(MID$(L$,L,1)):NEXT L
1210 IF CT=CV+(CV>5000)*5000 THEN 1250
1220 SOUND 400,4:COLOR 28:LOCATE 19,1
1230 PRINT "You have made a typo in line ";CHR$(64+ZY)
;".":COLOR 2
1240 GOSUB 3500:NL=3:GOSUB 5000:ZX=0:GOTO 1060
1250 IF CV>5000 THEN 1280
1260 CD$=CD$+LEFT$(L$,16):ZY=ZY+1
1270 IF ZY<16 THEN 1040 ELSE 1310
1280 T=16:FOR L=1 TO 15 STEP 2
1290 IF MID$(L$,L,1)="Z" THEN T=L-1:L=15
1300 NEXT L:CD$=CD$+LEFT$(L$,T)
1310 FOR L=1 TO LEN(CD$)-1 STEP 2
1320 X$=MID$(CD$,L,1):Y$=MID$(CD$,L+1,1)
1330 BD$(ASC(X$)-64,ASC(Y$)-64)=BK$:NEXT L
1340 GOSUB 6000:IF F$="" THEN SOUND 400,6:GOTO 1340
1350 CLS:PRINT "Press <M> for menu or <S> to solve"
1360 PRINT "the puzzle.";
1370 GOSUB 2510:IF K$<>"M" AND K$<>"S" THEN SOUND 400,
2:GOTO 1370
1380 IF K$="M" THEN 100
1390 MS=4:W=1:C$="EASDP":GOTO 390
1400 IF (K$<"A" OR K$>"Z") AND (K$<"0" OR K$>"9") THEN
 SOUND 400,2:GOTO 1090
1410 LOCATE ZY+1,ZX+6+INT(ZX/4)
1420 PRINT K$:MID$(L$,ZX+1)=K$
1430 ZX=ZX+1+(ZX=19):GOTO 1090
1440 SOUND 400,2
1450 PRINT "Are you sure you want to quit? ";
1460 GOSUB 5500:IF K$="N" THEN 100
1470 CLS:KEY ON:LOCATE ,,,VL+(VL=12),VL:END
2000 T$=STRING$(WD-2,205):COLOR 3:LOCATE TM,LM
2010 PRINT CHR$(201);T$;CHR$(187):FOR Y=1 TO HT
2020 LOCATE TM+Y,LM
2030 PRINT CHR$(186);SPC(WD-2);CHR$(186):NEXT Y
2040 LOCATE TM+HT+1,LM:PRINT CHR$(200);T$;CHR$(188)
2050 COLOR 2:RETURN
2500 LOCATE ,,1
2510 K$=INKEY$:IF K$="" THEN 2510
2520 LOCATE ,,0:IF LEN(K$)=2 THEN RETURN
2530 K=ASC(K$):K$=CHR$(K-(K>96)*(K<123)*32):RETURN
3000 FOR X=1 TO 15:FOR Y=1 TO 15
3010 BD$(X,Y)=M$:NEXT Y,X:RETURN
3500 PRINT:PRINT "Press any key to continue.";
3510 IF INKEY$="" THEN 3510 ELSE RETURN
4000 PRINT:COLOR 28:PRINT CHR$(7);"Disk I/O error."
4010 COLOR 2:PRINT
4020 PRINT "Please check disk and disk drive."
4030 GOSUB 3500:RETURN
4500 ON DK GOTO 4510,4510,4530,4530
4510 CX=CX+(DK=1)-(DK=2)
4520 CX=(CX+14) MOD 15+1:GOTO 4550
4530 CY=CY+(DK=3)-(DK=4)
4540 CY=(CY+14) MOD 15+1
4550 IF BD$(CX,CY)=BK$ AND W=1 THEN 4500 ELSE RETURN
5000 LOCATE 19,1:FOR L=1 TO NL:PRINT CL$
5010 NEXT L:RETURN
5500 GOSUB 2500
5510 IF K$<>"Y" AND K$<>"N" THEN SOUND 400,2:GOTO 5500
5520 RETURN
6000 CLS:INPUT "Save under what name";F$
6010 IF F$="" THEN RETURN
6020 ON ERROR GOTO 6060
6030 OPEN F$ FOR OUTPUT AS #1:PRINT#1,W
6040 FOR Y=1 TO 15:FOR X=1 TO 15:WRITE#1,BD$(X,Y)
6050 NEXT X,Y:CLOSE#1:ON ERROR GOTO 0:RETURN
6060 CLOSE#1:RESUME 6070
6070 ON ERROR GOTO 0:GOSUB 4000:F$="":RETURN
6500 DATA <1> Create your own crossword puzzle
6510 DATA <2> Work on an existing puzzle
6520 DATA <3> Create a puzzle using FC data
6530 DATA <4> Solve a puzzle,<5> Quit
```

Tandy Color Computer w/64K and disk drive (printer optional)/*Crossword Puzzler*

```
10 CLEAR 5000:DIM BD$(15,15),CM$(10),DM$(2),N$(15)
20 BK$=CHR$(128):P$=CHR$(46):SP$=CHR$(32)
30 CU$=CHR$(8)+CHR$(9)+CHR$(94)+CHR$(10)
40 UL$=STRING$(4,45):DM$(1)=SP$+"ACROSS"+SP$
50 DM$(2)=SP$+"DOWN"+SP$+SP$+SP$
60 FOR L=1 TO 15:N$(L)=MID$(STR$(L),2)+SP$:NEXT L
70 FOR L=1 TO 9:READ CM$(L):NEXT L
80 CLS:PRINT TAB(7);"CROSSWORD PUZZLER":PRINT
90 PRINT "<1> CREATE YOUR OWN CROSSWORD"
100 PRINT TAB(4);"PUZZLE"
110 PRINT "<2> WORK ON AN EXISTING PUZZLE
120 PRINT "<3> CREATE A PUZZLE USING FC"
130 PRINT TAB(4);"DATA"
140 PRINT "<4> SOLVE A PUZZLE":PRINT "<5> QUIT"
```

```
150 PRINT:PRINT TAB(10);"SELECTION:";
160 GOSUB 2000:MS=VAL(K$)
170 IF MS<1 OR MS>5 THEN SOUND 200,1:GOTO 160
180 CLS:ON MS GOTO 190,190,860,210,1270
190 C$="BAEDPS":W=0:IF MS=2 THEN 220
200 GOSUB 2500:GOTO 360
210 C$="EASDP":W=1
220 CLS:PRINT "WHAT IS THE NAME OF THIS"
230 LINE INPUT "PUZZLE? ";F$:IF F$="" THEN 80
240 GOSUB 3000:OPEN "I",#1,F$:INPUT#1,T
250 IF W=0 AND T=1 THEN 310
260 FOR Y=1 TO 15:FOR X=1 TO 15:INPUT#1,BD$(X,Y)
270 NEXT X,Y:CLOSE#1:IF W=0 OR T=1 THEN 360
280 FOR X=1 TO 15:FOR Y=1 TO 15
290 IF BD$(X,Y)<>BK$ THEN BD$(X,Y)=P$
300 NEXT Y,X:GOTO 370
310 CLOSE#1:CLS:SOUND 150,2
320 PRINT "SORRY!  THIS FILE IS NOT LOADABLE";
330 PRINT "FROM MENU CHOICE 2."
340 PRINT "SELECT <4> SOLVE A PUZZLE TO"
350 PRINT " LOAD IT.":PRINT:GOSUB 3500:GOTO 220
360 IF MS<>4 THEN CX=1:CY=1:GOTO 410
370 CX=0:CY=0:FOR Y=1 TO 15:FOR X=1 TO 15
380 IF BD$(X,Y)=P$ THEN CX=X:CY=Y:X=15:Y=15
390 NEXT X,Y:IF CX<>0 THEN 410
400 BD$(1,1)=P$:CX=1:CY=1:PRINT@35,P$;
410 CLS:PRINT TAB(3);
420 FOR L=1 TO 15:PRINT CHR$(64+L);:NEXT L
430 FOR Y=1 TO 15:PRINT@Y*32,N$(Y);
440 IF Y<10 THEN PRINT SP$;
450 FOR X=1 TO 15:PRINT BD$(X,Y);:NEXT X,Y
460 SK=2:PRINT@83,"PRESS </>,":PRINT@116,"THEN ..."
470 T=3:FOR L=1 TO 9
480 T=T+1:IF L=2 AND MS=4 THEN T=T-1:GOTO 500
490 PRINT@T*32+20,CM$(L)
500 NEXT L
510 PRINT@20,CHR$(64+CX);N$(CY);DM$(SK/2);
520 PRINT@CY*32+CX+2,SP$;CHR$(8);BK$;
530 PRINT@CY*32+CX+2,BD$(CX,CY);
540 K$=INKEY$:IF K$="" THEN 520
550 DK=INSTR(CU$,K$)
560 IF DK<>0 THEN GOSUB 4000:GOTO 510
570 IF K$<>"/" THEN 810
580 GOSUB 2000:CK=INSTR(C$,K$)
590 IF CK=0 THEN SOUND 200,1:GOTO 520
600 IF W=0 THEN ON CK GOTO 620,630,640,630,680,800
610 ON CK GOTO 640,630,800,630,680
620 K$=BK$:GOTO 830
630 SK=CK:GOTO 510
640 CLS:SOUND 150,3
650 PRINT "YOU HAVE NOT SAVED THIS PUZZLE."
660 PRINT "ARE YOU SURE YOU WANT TO EXIT?";
670 GOSUB 5000:IF K$="Y" THEN 80 ELSE 410
680 CLS:PRINT "PRESS ANY KEY WHEN PRINTER IS"
690 PRINT "READY.";
700 IF INKEY$="" THEN 700
710 PRINT#-2,TAB(5);:FOR L=1 TO 15
720 PRINT#-2,CHR$(64+L);SP$;:NEXT L:PRINT#-2
730 PRINT#-2,TAB(3);STRING$(33,"#")
740 FOR Y=1 TO 15:PRINT#-2,N$(Y);
750 IF Y<10 THEN PRINT#-2,SP$;
760 PRINT#-2,"#";SP$;:FOR X=1 TO 15:T$=BD$(X,Y)
770 IF T$<>BK$ THEN PRINT#-2,T$;SP$; ELSE PRINT#-2,"*"
;SP$;
780 NEXT X:PRINT#-2,"#";SP$;N$(Y):NEXT Y
790 PRINT#-2,TAB(3);STRING$(33,"#"):GOTO 410
800 GOSUB 5500:IF F$="" THEN 410 ELSE 80
810 GOSUB 2010
820 IF (K$<"A" OR K$>"Z") AND K$<>P$ THEN SOUND 200,1:
GOTO 520
830 BD$(CX,CY)=K$
840 PRINT@CY*32+CX+2,K$;
850 DK=SK:GOSUB 4000:GOTO 510
860 CLS:PRINT TAB(8);"INPUT FC DATA":GOSUB 2500
870 ZY=1:H$=UL$:FOR L=1 TO 4
880 H$=H$+","+UL$:NEXT L:CD$=""
890 PRINT@ZY*32,CHR$(64+ZY);SP$;H$
900 L$=STRING$(20,45):ZX=0
910 PRINT@448,"<ENTER>=MOVE TO NEXT LINE"
920 PRINT "</> THEN <E>=EXIT W/O SAVING";
930 PRINT@ZY*32+ZX+2+INT(ZX/4),SP$;CHR$(8);BK$;
940 PRINT@ZY*32+ZX+2+INT(ZX/4),MID$(L$,ZX+1,1);
950 K$=INKEY$:IF K$="" THEN 930
960 DK=INSTR(CU$,K$):IF DK<1 OR DK>2 THEN 990
970 ZX=ZX+(DK=1)-(DK=2)
980 ZX=ZX+((ZX=20)-(ZX=-1))*20:GOTO 930
990 IF K$<>"/" THEN 1020
1000 GOSUB 2000:IF K$="E" THEN SOUND 150,4:GOTO 80
1010 SOUND 200,1:GOTO 930
1020 IF K$<>CHR$(13) THEN 1230
1030 GOSUB 4500:CV=VAL(RIGHT$(L$,4))
1040 CT=0:FOR L=1 TO 16:CT=CT+ASC(MID$(L$,L,1)):NEXT L
1050 IF CT=CV+(CV>5000)*5000 THEN 1080
1060 SOUND 150,3:PRINT@448,"YOU HAVE MADE A TYPO IN LI
NE ";CHR$(64+ZY);"."
1070 GOSUB 3500:GOSUB 4500:ZX=0:GOTO 910
1080 IF CV>5000 THEN 1110
1090 CD$=CD$+LEFT$(L$,16):ZY=ZY+1
1100 IF ZY<14 THEN 890 ELSE 1140
1110 T=16:FOR L=1 TO 15 STEP 2
1120 IF MID$(L$,L,1)="Z" THEN T=L-1:L=15
1130 NEXT L:CD$=CD$+LEFT$(L$,T)
1140 FOR L=1 TO LEN(CD$)-1 STEP 2
1150 X$=MID$(CD$,L,1):Y$=MID$(CD$,L+1,1)
1160 BD$(ASC(X$)-64,ASC(Y$)-64)=BK$:NEXT L
1170 GOSUB 5500:IF F$="" THEN SOUND 150,1:GOTO 1170
1180 CLS:PRINT "PRESS <M> FOR MENU OR <S> TO
1190 PRINT "SOLVE THE PUZZLE.";
1200 GOSUB 2000:IF K$<>"M" AND K$<>"S" THEN SOUND 200,
1:GOTO 1200
1210 IF K$="M" THEN 80
1220 MS=4:W=1:C$="EASDP":GOTO 410
1230 IF (K$<"A" OR K$>"Z") AND (K$<"0" OR K$>"9") THEN
 SOUND 200,1:GOTO 930
1240 PRINT@ZY*32+ZX+2+INT(ZX/4),K$;
1250 L$=LEFT$(L$,ZX)+K$+MID$(L$,ZX+2)
1260 ZX=ZX+1+(ZX=19):GOTO 930
1270 SOUND 150,3
1280 PRINT "ARE YOU SURE YOU WANT TO QUIT?";
1290 GOSUB 5000:IF K$="N" THEN 80
1300 CLS:END
2000 K$=INKEY$:IF K$="" THEN 2000
2010 K=ASC(K$):K$=CHR$(K-(K>96)*(K<123)*32):RETURN
2500 FOR X=1 TO 15:FOR Y=1 TO 15
2510 BD$(X,Y)=P$:NEXT Y,X:RETURN
3000 SOUND 150,2:PRINT
3010 PRINT "PLEASE MAKE SURE DISK IS IN DISK";
3020 PRINT "DRIVE AND DOOR IS CLOSED."
3030 PRINT:GOSUB 3500:RETURN
3500 PRINT "PRESS ANY KEY TO CONTINUE.";
3510 IF INKEY$="" THEN 3510 ELSE RETURN
4000 ON DK GOTO 4010,4010,4030,4030
4010 CX=CX+(DK=1)-(DK=2)
4020 CX=CX+((CX=16)-(CX=0))*15:GOTO 4050
4030 CY=CY+(DK=3)-(DK=4)
4040 CY=CY+((CY=16)-(CY=0))*15
4050 IF BD$(CX,CY)=BK$ AND W=1 THEN 4000 ELSE RETURN
4500 PRINT@448,STRING$(63,32);:RETURN
5000 GOSUB 2000
5010 IF K$<>"Y" AND K$<>"N" THEN SOUND 200,1:GOTO 5000
5020 RETURN
5500 CLS:LINE INPUT "SAVE UNDER WHAT NAME? ";F$
5510 IF F$="" THEN RETURN ELSE GOSUB 3000
5520 OPEN "O",#1,F$:PRINT#1,W
5530 FOR Y=1 TO 15:FOR X=1 TO 15:WRITE#1,BD$(X,Y)
5540 NEXT X,Y:CLOSE#1:RETURN
6000 DATA <A>=ACROSS,<B>=BLOCK,<D>=DOWN,<E>=EXIT
6010 DATA <P>=PRINT,"   PUZZLE"
6020 DATA <S>=SAVE &,"   RETURN","   TO MENU"
```

The Patriot

BY DARYL E. WITMER

In December 1984, overnight, I became a victim of a very rare neurological condition known as Guillain-Barré Syndrome. For over four months I was in an intensive care unit, almost completely paralyzed in every part of my body. My hospital stay lasted eight months. But unlike a spinal cord injury, this condition is reversible—at least to some extent.

Shortly after my return home, my father put an Apple IIc computer in front of me. It was love at first sight. With a mouthstick and a keyguard device which allows handicapped people like myself to input two-key control functions, I was able to learn about my new computer and teach myself the BASIC language during the long months of rehabilitation. It was very therapeutic both mentally and physically. Using the mouthstick required that I sit up and struggle with the few muscles I could control, and I certainly had to use my mind! As my programming skills developed, I enjoyed designing colorful graphics programs and word games that I could play with my three sons. I also wrote *The Patriot* in celebration of our country's birthday.

The Patriot is a fun and colorful graphics program that draws the American flag to the tune of our national anthem. At the finale of the "Star Spangled Banner," an array of fireworks bursts onto the screen. Writing this program allowed me to express my patriotism and join in the spirit of the July Fourth festivities in ways that I might not have been able to without a computer.

Pastor Witmer uses a mouthstick to program his computer.

Today, having returned to full-time ministry, I find my computer to be an invaluable "assistant pastor". We have recently upgraded to the Apple IIGS with an ImageWriter II. I use the system for preparing sermons, maintaining parish records, writing correspondence, engaging in entertainment, and recording home finances. Now, I'm even writing a book about my ordeal with Guillain-Barré Syndrome. My sons share my enthusiasm for the computer. There's usually a battle for computer time among us: me, my 11-year-old twin boys Stephen and Andrew; and my 7-year-old son Timothy. I wonder how much longer my wife, Mary, can resist computer fever.

After almost three years, I'm still confined to a wheelchair and undergo extensive physical therapy, but the faithful support of my family, the church, and even my Apple computer continue to help me down the long road to recovery.

DARYL E. WITMER *is the Pastor at the Abbot Evangelical Free Church and the Monson Community Church for the Abbot-Monson Larger Parish in Abbot and Monson, Maine.*

Apple II series/*The Patriot*

```
10 FOR X = 768 TO 796:READ Y:POKE X,Y:NEXT X
19 REM --INTRODUCTION--
20 HOME:SPEED= 10:VTAB 7:HTAB 9
30 PRINT "LADIES AND GENTLEMEN"
40 VTAB 10:HTAB 9:PRINT "OUR NATIONAL ANTHEM!"
50 VTAB 13:HTAB 9:FOR X = 1 TO 20:PRINT CHR$(126);
60 NEXT X:SPEED= 255:FOR D = 1 TO 2000:NEXT D
69 REM --DRAW FLAG--
70 Z = 0:HOME:GR:COLOR= 15
80 FOR X = 0 TO 38:HLIN 0,39 AT X:NEXT X
90 COLOR= 9:FOR S = 1 TO 7:FOR X = 0 TO 39
100 VLIN Z,Z+2 AT X:NEXT X:Z = Z+6:NEXT S
110 COLOR= 2:FOR X = 0 TO 14:VLIN 0,20 AT X:NEXT X
120 FOR D = 1 TO 1500:NEXT D
129 REM --PLOT STARS--
130 L = -1:COLOR= 15:FOR R = 2 TO 18 STEP 2
140 FOR S = 2+(L = 1) TO 12 STEP 2
150 PLOT S,R:GOSUB 1000:NEXT S:L = -L:NEXT R
160 POKE 6,240:POKE 8,81:CALL 768
170 FOR D = 1 TO 1500:NEXT D:PRINT:PRINT:INVERSE
180 PRINT "  G O D   B L E S S   A M E R I C A !!!"
190 NORMAL:FOR D = 1 TO 3500:NEXT D:HOME
199 REM --FIREWORKS--
200 FOR FW = 1 TO 30:IF FW < 21 THEN HGR
210 C = INT(RND(1)*6)+2:IF C = 4 THEN 210
220 HCOLOR= C:H = INT(RND(1)*220)+30
230 V = INT(RND(1)*120)+30
240 FOR T = 1 TO 20
250 S = INT(RND(1)*T):B = INT(RND(1)*T)
260 HPLOT H+S,V+B:HPLOT H+B,V-S
270 HPLOT H-B,V+S:HPLOT H-S,V-B
280 IF FW > 20 THEN X = PEEK(49200)
290 NEXT T:IF FW > 20 THEN 330
299 REM --FIRECRACKERS--
300 FOR FC = 1 TO 5:X = PEEK(49200)
310 FOR FR = 30 TO INT(RND(1)*300)+50
320 NEXT FR:NEXT FC
330 NEXT FW
340 HGR:HCOLOR= 7:H = 139:V = 79
350 FOR GF = 1 TO 3:FOR T = 1 TO 73 STEP 3
360 S = INT(RND(1)*T):B = INT(RND(1)*T)
370 X = PEEK(49200)
380 HPLOT H+S,V+B:HPLOT H+B,V-S
390 HPLOT H-B,V+S:HPLOT H-S,V-B
400 NEXT T:NEXT GF
410 VTAB 24:PRINT:PRINT:FLASH:HTAB 7
420 PRINT "H A P P Y   B I R T H D A Y"
430 PRINT:HTAB 12:PRINT "A M E R I C A !!!"
439 REM --FINALE SERENADE--
440 FS = 60:FOR SN = 1 TO 50
450 FS = FS-5:IF FS < 30 THEN FS = FS+20
460 SL = INT(RND(1)*20)+7:IF SN = 50 THEN SL = 125
470 POKE 6,SL:POKE 8,FS:CALL 768:NEXT SN
480 NORMAL:FOR D = 1 TO 5000:NEXT D
490 TEXT:HOME:END
999 REM --NATIONAL ANTHEM--
1000 FOR T = 1 TO 2:READ N,D:POKE 6,D*20
1010 POKE 8,N:CALL 768:NEXT T:RETURN
1999 REM --MACHINE LANGUAGE FOR MUSIC--
2000 DATA 165,8,74,133,10,164,8,173,48,192,136,234,234
2010 DATA 208,251,165,7,56,229,10,133,7,176,237,198,6
2020 DATA 208,233,96
2999 REM --MELODY DATA--
3000 DATA 108,4,128,2,162,6,128,6,108,6,81,12,64,4,72
3010 DATA 2,81,6,128,6,114,6,108,12,108,4,108,2,64,10
3020 DATA 72,2,81,6,85,12,96,4,85,2,81,6,81,6,108,6
3030 DATA 128,6,162,6,108,4,128,2,162,6,128,6,108,6
3040 DATA 81,12,64,4,72,2,81,6,128,6,114,6,108,12,108
3050 DATA 4,108,2,64,10,72,2,81,6,85,12,96,4,85,2,81
3060 DATA 6,81,6,108,6,128,6,162,6,64,4,64,2,64,6,60
3070 DATA 6,53,6,53,12,60,4,64,2,72,6,64,6,60,6,60,12
3080 DATA 60,6,64,10,72,2,81,6,85,12,96,4,85,2,81,6
3090 DATA 128,6,114,6,108,12,108,6,81,6,81,6,81,3,85
3100 DATA 3,96,6,96,6,96,6,72,6,60,3,64,3,72,3,81,3
3110 DATA 81,6,85,12,108,4,108,2,81,9,72,3,64,3,60,3
3120 DATA 53,12,81,3,72,3,64,9,60,3,72,6
```

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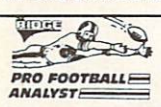

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